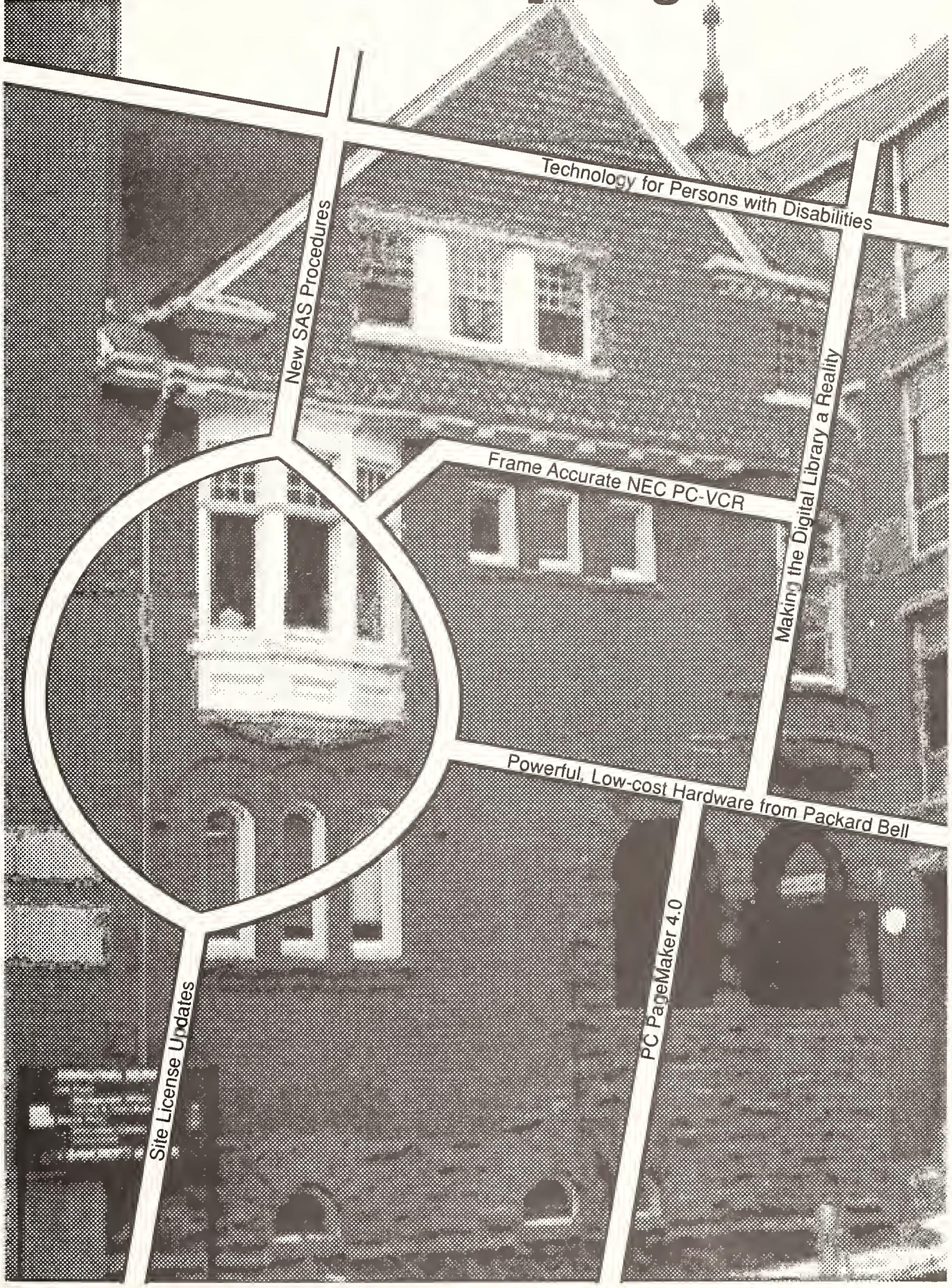
UTCS ComputerNews

university of toronto
computing services

Inside this issue...

New directions for computing


Technology for Persons with Disabilities
New SAS Procedures
Making the Digital Library a Reality
Frame Accurate NEC PC-VCR
Powerful, Low-cost Hardware from Packard Bell
Site License Updates
PC PageMaker 4.0

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Contents

News

CSUN Conference: Technology for Persons with Disabilities 1
National Net '91 5
SUGI's 16th Annual Conference 9
Changes in Site License Prices 10
CQUEST: Computing for the Future 11
C&C News 13

Reviews

Packard Bell PACK-MATE 386-XH 14
Packard Bell Force 17
NEC PC-VCR 19
What's New in PageMaker 4.0 for the PC 21
MacKermit version 0.98(62) 24

Numerical and Scientific Software

EasyPlot 26
Microcomputer Short Courses 28
SYSTAT News 29
Scientific Software Updates 30
NAg FORTRAN Library Mark 14 31

Departments

UTCS Services 32
Consulting and Enquiries 33
UTCS Directory 33
Terminal and Advising Sites 34
UTCS Site Licenses 35
UTCS Software List 36

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Conference at California State University Northridge:

Technology for Persons with Disabilities

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Two major activities in all of our lives, whether we like them or not, are working and going to school. These activities give us a chance to grow and learn. They give us a chance to meet people and make friends. And, let's not forget, working allows us to earn our own money and education gives us earning power.

In Los Angeles last March, an exciting opportunity took place to discover new technologies and see innovative applications of current technologies that allow persons with disabilities to participate more fully in these two activities. The conference, "Technology for Persons with Disabilities," attracted over 2000 participants from around the world. The presentations and assistive devices shown at the conference specifically addressed the issues of education and work.

The participants brought together a wide range of experience and professional expertise, including educators, employers, consumers, rehabilitation professionals, and equipment vendors.

Representatives of post-secondary institutions were there to discuss how they could better serve students with disabilities and allow them full access to the educational process. Employers were given the opportunity to learn about the implications of employment equity legislation and about accommodations that could be implemented in their workplaces. Consumers were given the chance to try products and discuss their needs with developers.

The conference focussed on opportunities that allow persons with disabilities to fully participate in society. Acting as an equalizer, technology is a means of modifying the environment to eliminate potential barriers to persons with disabilities. Advances in technology and assistive devices allow persons with disabilities to independently perform functions that many of us take for granted: opening the door, making a telephone call, writing a letter to a friend or, frustrating as it may be, trying to balance a cheque book. Without the proper tools, many people are totally dependent in performing these activities of daily living. By modifying the environment or providing an assistive device, the disability is being compensated for and the person is no longer handicapped in performing the activity.

> *...technology is a means of modifying the environment to eliminate potential barriers to persons with disabilities.*

Attitudes are slowly changing. Opportunities are being created, not only for the disabled person, but also for society to take advantage of the skills of this as yet untapped resource. As our work force ages and shrinks, we cannot afford to cut out this large group (10% of Canadians) because they don't "fit" into the environment. It's time we started making the environment fit them. I hope some of the products described below will give you ideas as to how you might accommodate a person with a disability in your classroom or office.

Conference Highlights

Project EASI

The widespread use of computers as teaching tools in education, and their integration into every discipline, emphasizes the need to ensure that campus computing environments are accessible to students, staff, and faculty with disabilities. To meet this goal, an enthusiastic group of people from various academic computing services and special services for students with disabilities have formed Project EASI (Equal Access to Software for Instruction). Project EASI is a subgroup of EDUCOM and its mission is "to serve as a resource to the higher education community by providing information and guidance in the area of access to information technologies by persons with disabilities." A number of Project EASI functions took place during the conference. Project EASI is currently developing a multi-unit package designed to offer strategies for developing and enhancing adaptive computer technology services on campuses. This workshop series is aimed at computing

The Project EASI logo.

services personnel, disabled student service providers, faculty, staff members, and campus administrators. A Speaker's Bureau has also been created, where speakers are available to discuss Project EASI and accessible computing in post-secondary environments.

Technology for Persons With Learning Disabilities

One of the largest group of disabled students in the university and college system are those with learning disabilities. Numerous conference presentations addressed strategies for using computers and assistive technology as tools for compensating for learning disabilities. Many of the tools are not specially designed; rather, they are off-the-shelf software packages such as word processors, spell checkers, outlining programs, and grammar checkers used to assist in the writing process. Abbreviation expansion programs, which reduce the number of keystrokes required for data entry, are being used as automatic spelling correctors. For students who are able to express themselves better verbally than in writing, voice input is a valuable tool for getting ideas into an essay. Students who can process information better aurally than visually use speech synthesizers to help with reading. Many are also using scanners and Optical Character Recognition systems that will "read" the book aloud to them. Here at the University of Toronto, some of our learning disabilities specialists are using these tools also.

At a pre-conference workshop, the staff from the Learning Disability Program and Computer Access Lab of the Office of Disabled Student Services at California State University Northridge (CSUN) presented an overview of these technologies and observations from their four years of operation. Guidelines for selecting and evaluating technologies, as well as instructing students with learning disabilities, were also given.

Speech Input Technology

The day when you can talk to your computer instead of banging away at a keyboard is almost here. Voice recognition technology is becoming widely used as an alternative means of data entry. A range of products were presented and their relative merits discussed at a pre-conference workshop. Low-end systems tend to be speaker-dependent and tend to have a limited vocabulary. The user must define the vocabulary and train the system to recognize the utterances. These lower cost systems, $800–$1500, work best in applications where there is a limited number of commands. In effect, they can be used as voice-activated "macros." Instead of hitting <Shift> <F7> <1> to print a document in WordPerfect, you can just say "PRINT" to execute the same command. However, for writing assignments or letters, this is not sufficient as a primary means of data entry. At the high end of the spectrum is the DragonDictate system which, with a vocabulary of 30,000 words, is an excellent tool for text production. However, at a cost of $11,000, it is not within everyone's budget. The system also requires a 386-class computer with a minimum of eight megabytes (MB) Random Access Memory (RAM) to run! Techniques and tips for training these systems were also presented.

Job Accommodation

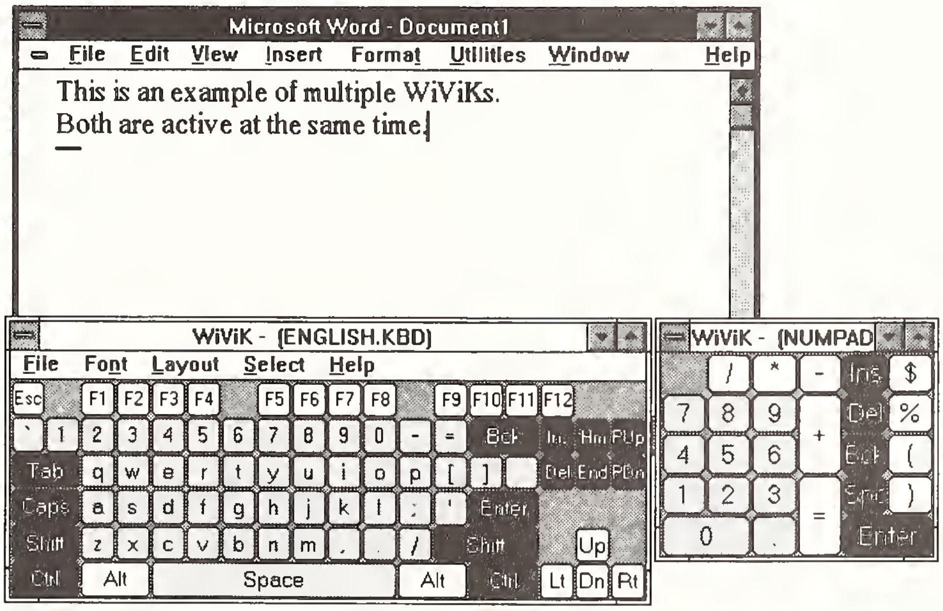
Numerous case studies and discussions of employment issues were presented throughout the conference. Current legislation—the Human Rights Code and Employment Equity legislation in Canada, and the Americans with Disabilities Act in the U.S.—ensures that persons with disabilities have equal access to education and work. One of the implications of these pieces of legislation is that educational institutions and employers must provide reasonable accommodation for persons with disabilities. Reasonable accommodation, in some cases, might be the provision of tools, such as assistive devices, that allow equal access to the institution's information and computing environments.

One workshop presented a discussion of changes in the labour market, in worksite technology, and the availability of assistive devices and their impact on employment opportunities. A panel consisting of three employees with disabilities shared their experiences in the employment sector. The need to take a systems approach when selecting assistive technology was stressed. Determining appropriate worksite accommodations requires both a functional analysis of a person's skills, abilities, and limitations, and a task analysis of the job. Technology can then be used to bridge the gap between these two areas, resulting in an effective worksite accommodation. Advances in communications have also made alternatives such as home employment more viable.

Graphical User Interfaces

By now, you've no doubt heard about Graphical User Interfaces (GUIs). These interfaces offer extensive benefits for all computer users; there are, however, potential barriers to access for persons with disabilities. GUIs are characterized by the use of visual images and the use of graphics to convey information. Conventional screen reading systems such as ARTIC, VERT, and IBM Screen Reader work only with character-based DOS applications. Both technical and conceptual barriers exist, making access to GUIs difficult for a blind user who is unable to find and interpret these visual cues.

The Windows visual keyboard.


Microsoft Word - Document1
File Edit View Insert Format Utilities Window Help
WiViK - [ENGLISH.KBD]
File Font Layout Select Help
Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12
` 1 2 3 4 5 6 7 8 9 0 - = Bck Ins Hm PUp
Tab q w e r t y u i o p [ ] Del End PDn
Caps a s d f g h j k l ; ' Enter
Shift z x c v b n m , . / Shift Up
Ctrl Alt Space Alt Ctrl Lt Dn Rt
WiViK - [NUMPAD
/ * - Ins $
7 8 9 + Del %
4 5 6 Bck (
1 2 3 = Snd)
0 . Enter

This is an example of multiple WiViKs.
Both are active at the same time.

With the popularity of Microsoft Windows increasing, developers are addressing accessibility issues with new interface products and techniques. A more detailed discussion of GUIs and persons with disabilities can be found in the September 1990 issue of *ComputerNews.*

Microsoft Windows

Windows-based applications are currently not accessible to persons unable to use a standard keyboard and a mouse. Few alternative access systems are commercially available. For the visually impaired, limited screen magnification packages are available from AI Squared and ARTIC Technologies. No screen reading/speech synthesis systems are available, making Windows totally inaccessible to the blind.

One of the few new developments for Windows 3.0 is an Optical Head Pointing device, called the Long Range Wand, combined with a keyboard emulator package called the Windows Visual Keyboard or "WiViK." The Hugh MacMillan Rehabilitation Centre in Toronto demonstrated this prototype system. It allows a user to access Windows' applications through use of a head-mounted lightpen. With the Long Range Wand, the user points at a character on the onscreen keyboard and selects it by making a slight head gesture. The character is then automatically entered into the active application. The pointer is also a mouse emulator, thus all cursor and mouse button functions are available through a slight movement of the head and a nod. The system should be available commercially in the second half of 1991.

outSPOKEN, inTOUCH on the Macintosh

The platform where the most progress in screen access for the blind has taken place is the Macintosh with outSPOKEN and inTOUCH. OutSPOKEN provides speech-based access to characters displayed in an application and to labelled icons such as the Trash. The software also recognizes and tracks information about menus, scroll bars, and control buttons. All of the mouse functions are replaced by keyboard commands. InTOUCH allows a user to "feel" images on the screen. It uses an Optacon which presents a tactile image of text through the use of vibrating pins. A major drawback of using a tactile system is that it can take up to 2000 hours to become proficient in recognizing each individual character.

Other products under development take a multisensory approach to accessing information. These include tactile-based systems that are used with speech output. With the use of three-dimensional sound reproduction, the words being spoken will sound like they are coming from the point on the screen where they are located.

Whether some or all of these approaches are transferable to other operating environments, such as Windows on the PC, remains to be seen.

Other Products on Display

SoundProof

A new product has been developed specifically for learning-disabled users who would like speech access to the screen. Traditionally, screen reading software is designed for blind users and has complex features not necessary if you can see the screen. With SoundProof, the user may review individual words, sentences, and paragraphs; the text is highlighted on the screen as it is spoken. The software is memory-resident and can be used with your favourite word processor. The user enters a review mode where he or she can have words, sentences, or whole paragraphs spoken.

KE;NX

KE;NX is a keyboard emulator that allows for alternative methods of controlling a Macintosh computer. The system allows for connection of custom keyboards, switch access for Morse code or scanning, and alternative mouse control.

The Access Mobility System

Staircases and steps are one of the most common architectural barriers encountered by a person in a wheelchair. The Access Mobility System is an electric wheelchair that can climb and descend stairs. The chair, whose wheelbase looks like a tank, detects the edge of a staircase and slowly ascends or descends. The driver of the chair remains level, with just the wheelbase slanting to the angle of the steps.

CELEXX

CELEXX is a Point-of-Sale system for visually impaired users. Resembling a cash register, CELEXX has a built-in speech synthesizer.

RapidText

RapidText is a captioning system for the hearing-impaired which can be used with MS-DOS computers. A trained operator keys in information using a high-speed stenographic machine. In a classroom or meeting setting, a stenographer can key in the information and have it simultaneously displayed on a monitor allowing a hearing-impaired person to follow the presentation.

Corporate Support

Corporate support for this event was considerable. Notable in the exhibition hall was the presence of major computer vendors, including Apple, IBM, and NeXT. Apple sponsored a Macintosh Lab where participants were able to attend workshops on how to use the Macintosh with various assistive devices. Many of the workshops focussed on the use of HyperCard as a tool for building switch-accessible applications. Access to the Macintosh for people who were visually-impaired or blind was a hot topic of discussion.

IBM's National Support Centre for Persons with Disabilities demonstrated some of the access devices that they have developed in-house, as well as third-party access products. The IBM Screen Reader is a screen access system for the blind that works with a number of speech synthesizers. The Speech Viewer is a tool for use in speech therapy. The IBM Phone Communicator allows a hearing-impaired user to communicate over the phone with a hearing person. Recent developments in providing access to OS/2, primarily with the ScreenReader, were also presented.

NeXT had a large contingent of representatives demonstrating their equipment and applications, but none of it is accessible to persons with disabilities yet.

Upcoming Conferences

If you missed the conference this year, you may want to catch some of the other major conferences that are coming up. For an overview of the technology and ideas about where it can be applied, consider Closing the Gap, held every October in Minneapolis, one of the oldest and largest conferences. RESNA, the Interdisciplinary Association for the Advancement of Rehabilitation and Assistive Technologies, holds a conference every June. Those interested in the technical research and development end of things may want to choose this conference. Look for RESNA in Toronto in June of 1992.

If you want more information, the October 1990 *ComputerNews* article "Accessible Computing: Adaptive Technology for Persons with a Disability," describes some of the issues relating to computers and assistive devices.

The conference provided an excellent overview of technologies available for persons with disabilities. The strong focus on education and work, and on the development of assistive devices that are compatible with corporate computing environments, is an indication of slowly-changing attitudes and increasing opportunities for persons with a disability. Maybe I'll see you there next year.

For more information, contact Monica Ackermann at 978-8823 or send e-mail to *ackerman@utcs.utoronto.ca*.

National Net '91

Conference Report

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There are approximately 50 million titles catalogued in university libraries throughout Canada. Suppose you need to access some of these for research. You start up your computer and, within a minute, you are looking at the pages you need. Then you wonder whether your colleague overseas has completed the collection of digitized photographs that you can use for research. Within another minute, an image of your colleague appears in one window on your screen and, as requested, several rare photographs from your colleague's collection appear in another window. You see, hear, and speak to your colleague as easily as you would using the telephone.

These visions of a digital library and so-called "collaborative technology" are no longer science-fiction. Last March, the EDUCOM National Net '91 conference in Washington D.C. presented many pilot projects that laid down the groundwork for advanced applications on high-speed computer networks. Some of the highlights of the digital library presentations will be discussed in this article, and the collaborative technologies will be covered in the next issue of *ComputerNews*.

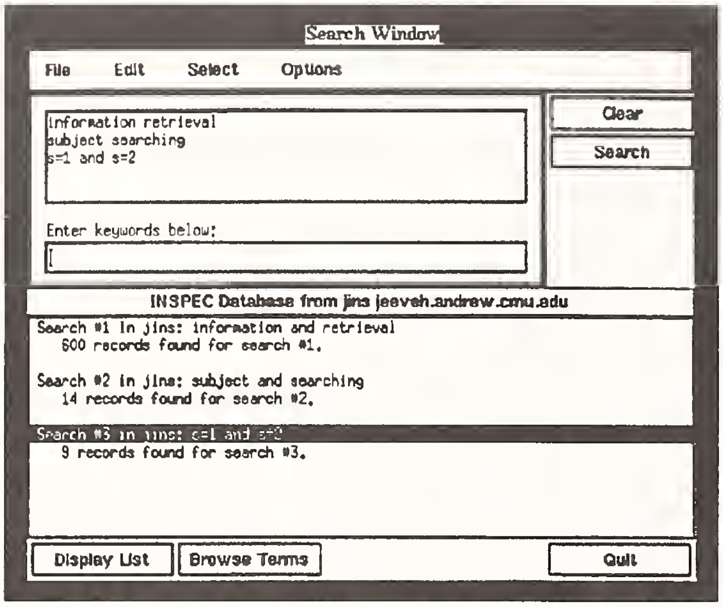
Carnegie Mellon University's Project Mercury

The concept of a digital library—the vision of a person performing a search for any page of any kind of library material delivered within seconds via a computer network—has been around for some time. One of the reasons that digital libraries have been difficult to implement is that computers and their network applications have been far too slow to be able to process queries and retrievals of the tera-bytes (one million million bytes) of information that exist in a digital library. During the 1970s and early 1980s, online bibliographic catalogues were developed, such as the FELIX system used at U of T. The last half of the 1980s was spent providing intelligent access methods to the online catalogues.

The Project Mercury pilot, started in 1988 at Carnegie Mellon University in Pittsburgh, is an example of the state-of-the-art digital library. The primary aim of Project Mercury is to provide library documents, in full text, in a form that can be easily searched for and read via computer networks. Bibliographic and graphic information can also be retrieved and browsed from the library database.

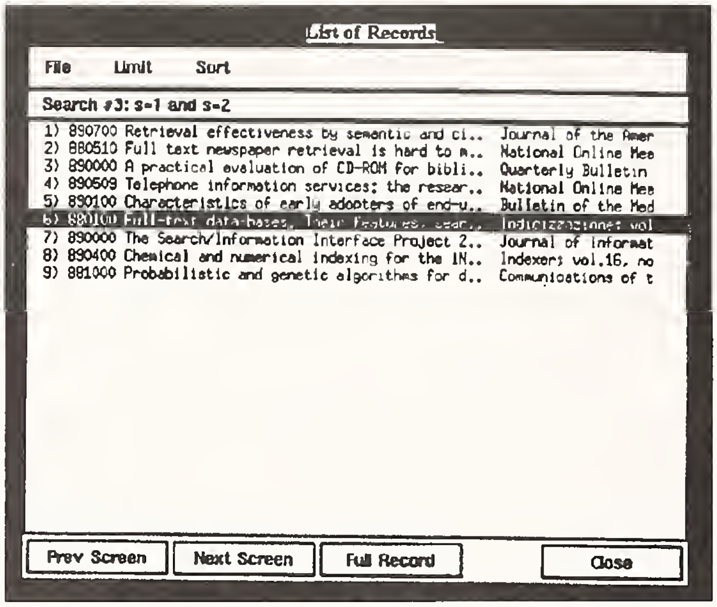
The digital library is implemented using a client-server architecture over a TCP/IP network. The server and client workstations communicate using the American National Information Standards Organization's (NISO) Z39.50 bibliographic information retrieval protocol. One computer on the network acts as a retrieval server by processing retrieval requests from workstations on the network and retrieving the information from a library database. The workstations run programs that provide tools for displaying information as well as tools for decompressing the information from the server (the retrieved text or graphics may be in compressed form in order to reduce the volume of traffic on the network). Many types of devices can be used to run the client programs, including Macintosh personal computers and dumb terminals. The workstations enable the user to compose a search for library material in a conventional way, either by author, title, subject, or a combination of these.

The first set of figures (next page) shows three windows of a typical search session using the LIS II (Library Information System) Motif user interface. *Figure 1a* shows a search window where three searches have been made. Notice that search three is formed from



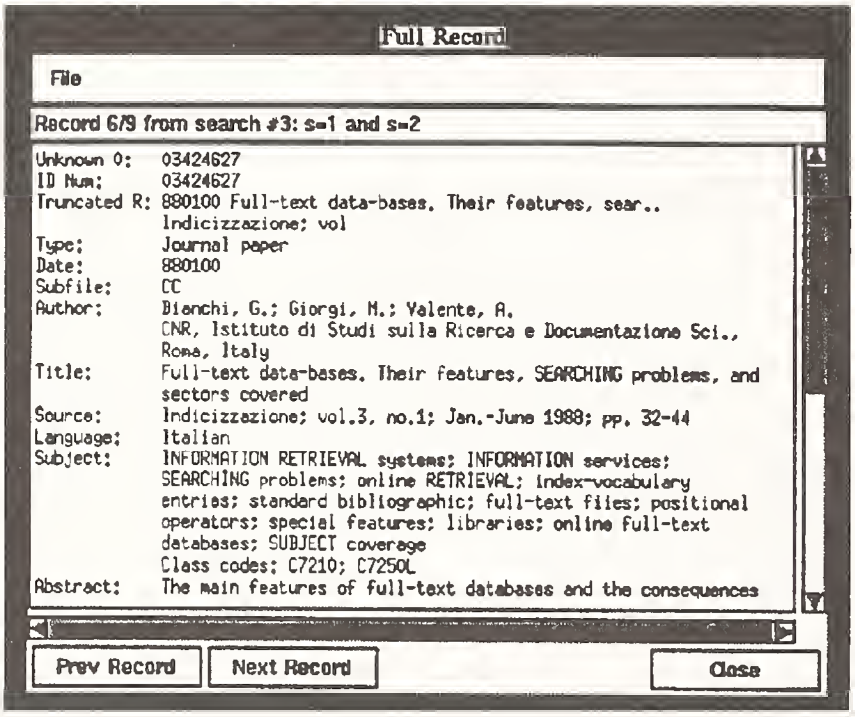
```
information retrieval
subject searching
s=1 and s=2

Enter keywords below:

INSPEC Database from jins jeeveh.andrew.cmu.edu
Search #1 in jins: information and retrieval
   600 records found for search #1.

Search #2 in jins: subject and searching
   14 records found for search #2.

Search #3 in jins: s=1 and s=2
   9 records found for search #3.
```

Figure 1a



```
Search #3: s=1 and s=2
1) 890700 Retrieval effectiveness by semantic and ci..  Journal of the Amer
2) 880510 Full text newspaper retrieval is hard to m..  National Online Mee
3) 890000 A practical evaluation of CD-ROM for bibli..  Quarterly Bulletin
4) 890509 Telephone information services: the resear..  National Online Mee
5) 890100 Characteristics of early adopters of end-u..  Bulletin of the Med
6) 880100 Full-text data-bases. Their features, sear..  Indicizzazione: vol
7) 890000 The Search/Information Interface Project 2..  Journal of informat
8) 890400 Chemical and numerical indexing for the IN..  Indexer; vol.16, no
9) 881000 Probabilistic and genetic algorithms for d..  Communications of t
```

Figure 1b



```
Record 6/9 from search #3: s=1 and s=2
Unknown 0:     03424627
ID Num:        03424627
Truncated R:   880100 Full-text data-bases. Their features, sear..
               Indicizzazione: vol
Type:          Journal paper
Date:          880100
Subfile:       CC
Author:        Bianchi, G.; Giorgi, M.; Valente, A.
               CNR, Istituto di Studi sulla Ricerca e Documentazione Sci.,
               Roma, Italy
Title:         Full-text data-bases. Their features, SEARCHING problems, and
               sectors covered
Source:        Indicizzazione; vol.3, no.1; Jan.-June 1988; pp. 32-44
Language:      Italian
Subject:       INFORMATION RETRIEVAL systems; INFORMATION services;
               SEARCHING problems; online RETRIEVAL; index-vocabulary
               entries; standard bibliographic; full-text files; positional
               operators; special features; libraries; online full-text
               databases; SUBJECT coverage
               Class codes: C7210; C7250L
Abstract:      The main features of full-text databases and the consequences
```

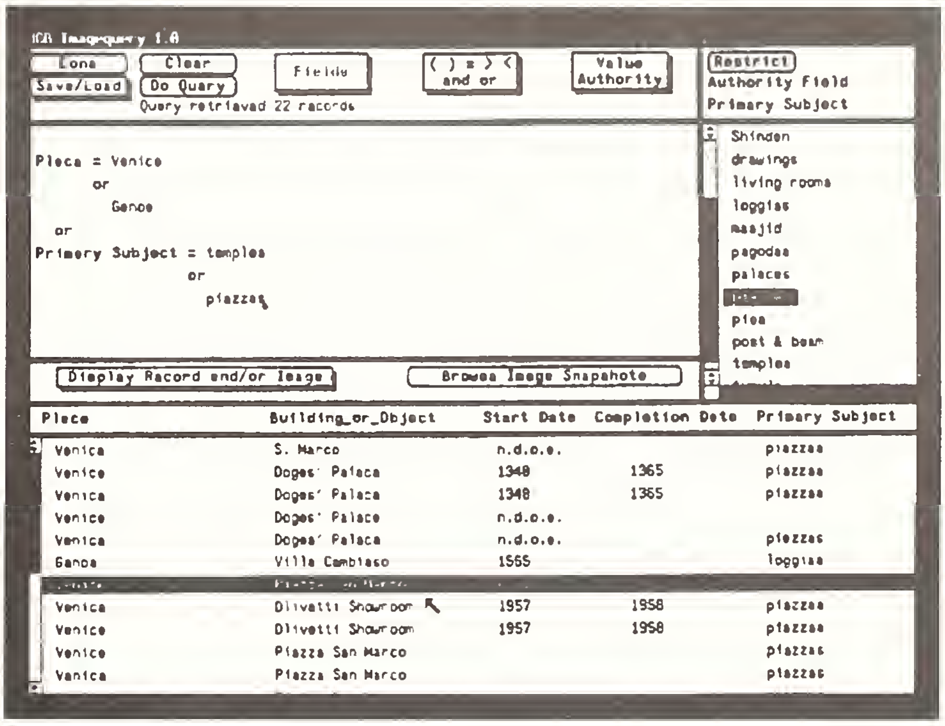
Figure 1c

searches one and two. Search three is highlighted by pointing and clicking with the mouse. If the Display List box at the bottom of the window is clicked, the List of Records window opens on the screen (see *Figure 1b*) displaying the nine records of search three. When the sixth record is selected and the Full Record box is clicked on, the Full Record window (*Figure 1c*) is displayed and shows the full bibliographic record. There is no figure for the fourth window, the Image window, which would display bitmapped images of text and graphics of the item found.

Project Mercury gives immediate value to faculty and students of the departments lucky enough to have their journals available for viewing via computer networks, but is only the beginning of the kind of digital library envisioned earlier. Project Mercury is currently exploring issues critical to digital library research and development, from user interfaces to the enhancement of communication protocols such as Z39.50.

The University of California Berkeley Image Database Project

Many universities have large collections of visual materials. The University of California at Berkeley has about 50 large collections of photographs and slides in the areas of architecture, art history, botany, geography, and history. Some collections contain millions of slides. Also on the campus are museum materials such as rare manuscripts in the departments of anthropology, art, and paleontology. These collections are housed in various buildings across the campus and are



```
Query retrieved 22 records

Place = Venice
      or
        Genoa
  or
Primary Subject = temples
                   or
                     piazzas
```

```
Place            Building_or_Object      Start Date  Completion Date  Primary Subject
Venice           S. Marco                n.d.o.e.                     piazzas
Venice           Doges' Palace           1348        1365             piazzas
Venice           Doges' Palace           1348        1365             piazzas
Venice           Doges' Palace           n.d.o.e.
Venice           Doges' Palace           n.d.o.e.                     piazzas
Genoa            Villa Cambiaso          1565                         loggias
[illegible]
Venice           Olivetti Showroom       1957        1958             piazzas
Venice           Olivetti Showroom       1957        1958             piazzas
Venice           Piazza San Marco                                     piazzas
Venice           Piazza San Marco                                     piazzas
```

Figure 2a

not under the jurisdiction of the main campus library.

The main problem faced in managing such a collection is in providing intellectual access to the materials. Searching an image collection for a particular photograph or painting may be simplified by searching with subject, date, material type, or other classifications. But when classifications as broad as these are used, the search may require visual inspection of hundreds of items.

UC Berkeley designed the Image Database project to test the feasibility of network access to these maps, slides, paintings, photographs, rare manuscripts, museum artifacts, botanical specimens, and other visual materials. The Image Database project was to provide visual browsing tools on computer workstations without physically handling the delicate materials during searches.

The notion of the "scholar's workstation" is essentially the vision of a digital library. In fact, Carnegie Mellon University is a site license holder of the programs IMAGEVIEW and IMAGEQUERY, which allow a user to search for visual material on a network. IMAGEVIEW and IMAGEQUERY were developed on SUN workstations and now run under the X Window system on many types of computers. The user would start a search by invoking IMAGEQUERY with the collection name, which currently may be any one of University Art Museum, Architecture Slide Library, Anthropology Museum, or Geography. Then, text-based cataloguing and indexing are used to narrow the search to a reasonably-sized set (a few dozen) of images.

Figure 2 shows an IMAGEQUERY session of a search narrowed to temples and piazzas in Venice or Genoa. The results of the query are displayed at the bottom of the screen. Selecting the Browse button would display slide-sized colour images of the initial query on the right side of the screen. Many slides may be displayed on the screen at once, sometimes filling up the entire screen. At any time, the user could point to a slide, and use the menus at the top of the screen to see the associated text record, or view a high-resolution colour enlargement of the slide. New queries could be formed by grouping some of the slides together using the mouse.

The display of IMAGEQUERY was very impressive. The architecture slide database at UC Berkeley was queried from Washington. The demonstration used the high-speed (44 megabits per second) National Science Foundation Network (NSFNET) to browse through slides of Italian architecture. The architecture slide database contains about 250,000 items. Dozens of slides were viewed faster than if they had been viewed manually. One of the slides had not been digitized as well as it could have been, but using some of the tools provided by the IMAGEVIEW program, a darkened part of the slide was enhanced to show the image of people at a market that was not initially visible.

Project Mercury and the UC Berkeley Image Database project illustrate that it is possible to implement a digital library using current computer networking technology. Technically, it is possible to access intellectual information quickly, regardless of its location.

But until the economic and legal issues associated with the ownership of and access to intellectual property are resolved, a digital library cannot be realized.

In the next issue of *ComputerNews*, I will report on the use of collaborative technology in the Human Genome Project and peer-reviewed journals. If you have any questions, please contact Glenn Britton at 978-6346.

SUGI's 16th Annual Conference

The SAS User Group International's (SUGI) 16th annual conference was held in New Orleans, Louisiana from February 17–20, 1991. Among the 4,000 attendees were three UTCS staff, including Barry Lay and myself from the the Statistics and Numerical Analysis Support Group. Barry spent his time learning about SAS releases for various operating systems, such as UNIX, OS/2, and DOS under Windows 3. I concentrated on learning about the new developments in the SAS system which addressed the needs of data analysts.

The SUGI conference was a good opportunity to learn more about the ever-expanding SAS system. The paper presentations and workshops covered all aspects of SAS. In the software demonstration area, SAS was displayed on a wide variety of hardware platforms. We were able to see future releases of the SAS system, which are currently being developed, and to talk to the developers and other technical support staff.

SAS Institute hosted the opening session, which included announcements about the future directions of the SAS system. Production versions of SAS 6.07 for various UNIX operating systems will be released throughout 1991. SAS 6.07 for UNIX will include SAS/INSIGHT, an exploratory data analysis tool; support for X Windows-based graphical user interfaces; and a new graphics editor for SAS/GRAPH. SAS/NVISION, for three dimensional modelling and animation, is also being released for some UNIX systems, such as Silicon Graphics.

SAS 6.07 and Experimental Releases

SAS version 6.07 for CMS, MVS, and VMS will include experimental releases of SAS/LAB, a front-end data analysis system for SAS/STAT, and SAS/CALC, a new version of SAS' spreadsheet product. This version of SAS is planned for release in late 1991. Another new product is SAS/EIS, a developer's tool for building Executive Information Systems.

There are several improvements to the SAS system for data analysts. I have already mentioned SAS/INSIGHT and SAS/LAB. There is another new product called SAS/PH-Clinical for clinicians and biostatisticians. Two new procedures are PROC MIXED, for mixed models, and PROC PHREG, for proportional hazards regression. I will briefly describe the features of these new products and procedures.

SAS/INSIGHT is an exploratory data analysis tool for UNIX workstations. This product brings to the UNIX environment statistical graphics features of JMP, SAS' Macintosh product (see below). These features include interactive histograms and scatterplot matrices, and the ability to rotate plots in three dimensions. Some analytical capability is available as well.

SAS/LAB is an interactive front-end application for SAS/STAT, designed for scientists and engineers. It provides an easy-to-use interface for simple statistical techniques such as univariate statistics, ANOVA, and regression. There are some simple graphics capabilities and some comments are presented about the statistical validity of the results. A potential teaching tool, SAS/LAB will be an experimental release, available with SAS version 6.07 for CMS, MVS, and VMS.

SAS/PH-Clinical is targetted towards the pharmaceutical industry and is a front-end application for the SAS system. This application provides quick access, review, and assimilation of clinical trials data. An exit is provided to the SAS Display Manager for more experienced SAS users. It will be released initially for the CMS, MVS, and VMS platforms.

PROC MIXED is a new SAS/STAT procedure for mixed models, that is, models which have fixed and random effects. This is a new approach for analyzing split plot or repeated measures designs. This procedure will now handle imbalances (unequal cell counts) in the data. You can also analyze one-way ANOVA designs where the group variances are not equal, or analyze time series data with missing values. This is a major enhancement for the analysis of linear models. Planned for experimental release in late 1991 for 6.07 platforms, it is not clear that this procedure will ever be available for SAS/PC release 6.04.

PROC PHREG for proportional hazards regression is a replacement for the SUGI Supplementary Library procedure PROG PHGLM, which was available under SAS version 5.18. This new procedure performs Cox's semi-parametric regression analysis of survival time data. At the time of writing, the SAS/PC version 6.04 release of this procedure was ready to be mailed to SAS customers. Current SAS/PC version 6.04 users will be able to add this procedure to their installation.

Sandra Gardner
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JMP 2.0 for the Macintosh

JMP is SAS' product for the Macintosh computer. It is different from the SAS system and its strengths are exploratory data analysis and statistical graphics. It has good analytical capabilities as well. I enjoyed looking at JMP version 2.0, due to be released this summer. (See *ComputerNews* November/December 1989 for a review of version 1.0). Among the many enhancements are the abilities to handle repeated measures designs through the mixed model approach described above, to perform non-linear regression, to summarize the data into tables, and to perform correspondence analysis. I am very impressed with this product. (By the way, I have a demonstration diskette of version 1.0 if you are interested in seeing JMP for yourself.)

Conference Sessions

A couple of the conference presentation sessions that I found interesting were the Workshop on Categorical Data Analysis and a talk on Statistical Graphics for Multivariate Data. Michael Friendly, of York University, presented the talk on statistical graphics and participated in a round table discussion about this topic. His new book, *The SAS System for Statistical Graphics,* will be published by SAS Institute this spring.

SAS Software at U of T

The amount of software available under the SAS system is growing rapidly and, consequently, so is the cost. A user, though, can license any group of modules which suits his/her own computing needs. Given everything that SAS offers now and what will be offered in the future, it is often difficult to decide which parts of the SAS system you need. UTCS has recently reviewed the site license we offer to our own user community. The current products are being maintained but the site license fees have been revised (see articles following). I would like to hear from anyone who might be interested in any of the new SAS products I have already mentioned. UTCS may be able to add some of these products to our site license if there is sufficient interest.

UTCS currently supports SAS version 5.18 under CMS. SAS version 6.06 under CMS is in test mode only. CMS users should be able to access this version by July this year.

UTCS also provides a site license for SAS/PC version 6.04 and SAS version 6.03 for SUN 3 and SUN 4 workstations. The current modules and annual license fees are given in the article following. Special pricing is available for PC network stations. Manuals may be purchased from UTCS also.

If you have any questions or comments about SAS or SUGI 16, please call me at 978-5128 or send an e-mail message to *sgardner@vm.utcs.utoronto.ca.*

New SAS 6.06 Manuals For Sale

Patricia Hood
phood@vm.utcs.utoronto.ca

The following manuals for use with SAS 6.06 (soon to be available on CMS), may be purchased at the UTCS Information Office, 4 Bancroft Avenue, Room 201. For more information, contact Evelyn Ward at 978-4990.

Title	Price
SAS Language and Procedures: Introduction	$12.50
SAS Language and Procedures: Usage	$21.00
SAS Language and Procedures: Syntax	$8.50
SAS Language: Reference	$26.00
SAS Procedures Guide	$22.00
SAS/FSP Software: Usage and Reference	$30.00
SAS/GRAPH Software: Introduction	$12.00
SAS/GRAPH Software: Reference, Vols. 1 and 2	$73.00
SAS/STAT User's Guide, Vols. 1 and 2	$46.00
SAS Technical Report P-204, SAS Software, Changes and Enhancements, Release 6.06	$6.00
SAS Companion for the CMS Environment	$17.00

Two manuals of general interest are now available at the UTCS Information Office also. They are:

SAS Programming Tips: A Guide to Efficient SAS Processing	$17.00
SAS System for Elementary Statistical Analysis	$26.75

Changes in Site License Prices

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UTCS has changed its pricing policy for site license software. As a result, most site licenses will cost less when it comes time to renew them. (WordPerfect software price changes were announced in the April 1991 issue of *ComputerNews* and are already in effect.) Unfortunately, the SAS/UNIX costs will substantially increase; WATFOR-77 will remain the same.

Previously, some annual licenses were reduced to half price when only three months were remaining in the contract year. This feature has been discontinued.

If you currently hold a site license for one of the products below, revised contracts and information will be mailed to you prior to the beginning of your new license period. The new pricing takes effect July 1, 1991 for most of the licenses, since this is the beginning of their license period. For further information, please contact Evelyn Ward at 978-4990.

Site License	New Price	Old Price	Effective Date
Chaos 1	$12.00	$12.00	May 1, 1991
QuickMail (New)	$35.00	$35.00	May 1, 1991
QuickMail (Upgrade)	$17.00	$10.00	May 1, 1991
ProComm	No charge	No charge	
SAS/PC*	$35.00	$70.00	July 1, 1991
ETS module	$35.00	$20.00	July 1, 1991
IML module	$22.00	$35.00	July 1, 1991
SAS/PC Network*	$17.00	$35.00	July 1, 1991
SAS/UNIX (SUN 3)**	$198.00	$150.00	July 1, 1991
FSP module	$70.00	$50.00	July 1, 1991
IML module	$70.00	$50.00	July 1, 1991
SAS/UNIX (SUN 4 and HP 8)**	$264.00	$150.00	July 1, 1991
FSP module	$92.00	$50.00	July 1, 1991
IML module	$92.00	$50.00	July 1, 1991
SPSS/PC	TBA	$100.00	November 1, 1991
SYSTAT	$58.00	$100.00	July 1, 1991
WATFOR-77	$35.00	$35.00	July 1, 1991
GKS module	$5.00	$5.00	July 1, 1991

*Includes BASE, STAT, GRAPH, and FSP modules
**Includes BASE, STAT, and GRAPH modules

Please note: SPSS/PC pricing will change November 1, 1991, the changeover date for its license period. Revised pricing will be announced in the October 1991 issue of *ComputerNews*.

CQUEST:

Computing for the Future

Elizabeth Rayson

In June of 1990, Digital Equipment of Canada (DEC) donated computing equipment valued at $1.4 million as a contribution toward the University of Toronto's CQUEST (Computers in Quantitative and Empirical Science Teaching) program. Already, this gift has been used by a variety of University departments (in the Faculty of Arts and Science) in a cooperative effort to enhance the academic aspect of the undergraduate experience. It not only provides undergraduates with access to the types of hardware and software they will be using when they graduate, but benefits the departments themselves as well, by allowing them to work together with a new awareness of common goals and aspirations.

How has CQUEST developed since the receipt of the equipment in mid-1990? The project is well under way, with two completed sites and three more expected in the next three years. Each site consists of a Local Area Network (LAN) of DEC workstations and VT1000 X Windows graphics terminals, and three PostScript laser printers. The two existing CQUEST sites are located in Rooms 211-213 in the Ramsay Wright building, and Room 2105 in Sidney Smith, and they are being used by undergraduates in five U of T departments: Psychology, Botany, Statistics, Zoology, and Geography. According to Ferucio Ciobanu, the Coordinator of the sites, they served approximately 3000 students last term. Apart from the much-needed improvement in the quality and availability of computing facilities for undergraduates, Ruth Croxford of the Department of Statistics also thinks that CQUEST promotes an increased awareness of what her colleagues in other departments are doing. Croxford comments that she wasn't as aware of what was going on within other U of T departments before Statistics became part of CQUEST. Now that the Statistics department shares a common computing interface—and some of the same software—with four other U of T departments, she finds that the cooperation and communication between the different disciplines has improved substantially. Croxford sees this as a major advantage, one that promotes a smooth, common learning environment. Students no longer have to learn different statistical software for different courses, and can become immediately proficient in a new course simply because they are familiar with the computing interface and the software.

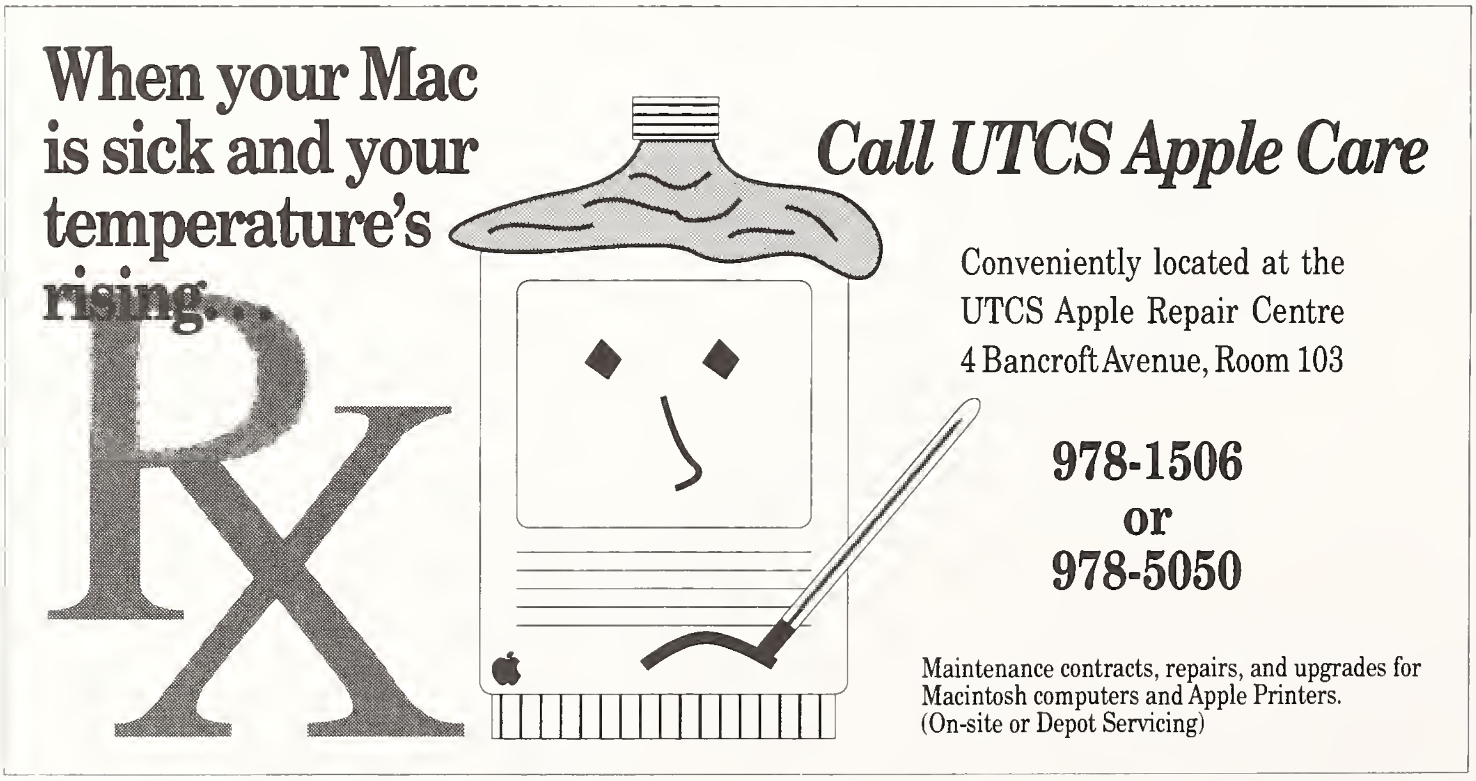
One of the departments which shares statistical software with Statistics is Psychology. Brian Jarvis, the department member responsible for the technical support of CQUEST facilities, praises DEC's donation because it enables him and his colleagues to "view the data in ever-more interesting formats". This, he says, is due to the more advanced colour graphics capabilities of the Psychology department's DECstation 2100. While this machine is used for research and development purposes, undergraduates in the Psychology department are more likely to take advantage of the VT1000 X Windows terminals available in the Sidney Smith and Ramsay Wright buildings. Jarvis says that although the availability of these CQUEST machines is a vast improvement over previous years, he would like to see more X Windows terminals added to the networks as CQUEST continues to develop. This, he says, would facilitate greater access to the equipment for the undergraduates. In fact, Psychology professor Ian Spence says that student use of the facilities will actually increase with the beginning of the 1991 Fall term, when at least three additional Psychology courses will use them. He plans to have students in one undergraduate course (Psych 305) and two graduate courses (Psych 2001 and 2002) use the CQUEST sites as part of the course content.

Another department playing a key role in the CQUEST program is Geography. Professor

Larry Band uses the graphics capabilities of the CQUEST equipment in his “Geographic Information Systems” course for graphing and, in particular, image processing. This course requires computing facilities able to perform two-dimensional and three-dimensional visualization of geographic data; for example, a graphical representation of the distribution of the population over a city. These capabilities are also required in his “Remote Sensing” course where satellite images of the earth’s surfaces are used for modelling. Like the Statistics and Psychology departments, Geography also uses CQUEST resources to teach basic statistics in its “Introduction to Analytical Methods” course. Professor Band adds that his department will have one more course involved in the CQUEST program in the fall of 1991, “Introduction to Data Processing in Geography,” and that he expects the number of users of the CQUEST facilities to increase as more courses utilize them, and as staff and students become more familiar with what they have to offer.

Like Geography, the Department of Zoology uses the graphing capabilities of CQUEST’s X Windows graphics terminals in “Organisms in their Environment”, one of its core first-year courses. These terminals not only give first-year students an attractive, user-friendly interface to work with, but allow them to see computer simulations of basic biological processes as well. The students can view computer simulations of genetic processes, for example, and then print out high-quality graphs of the data on a laser printer. Although “Organisms in their Environment” is presently the only course offered by the Zoology department that makes use of CQUEST resources, the department plans to involve third and fourth year courses in CQUEST as the program continues to develop.

What does the future hold for CQUEST? Ferucio Ciobanu estimates that there may be five completed sites available throughout the U of T campus by 1993, and further expansion is very possible if interest in the program continues to grow. Just a year after DEC’s donation, the CQUEST program is already well on its way toward maintaining U of T’s world class reputation for excellence in science education.



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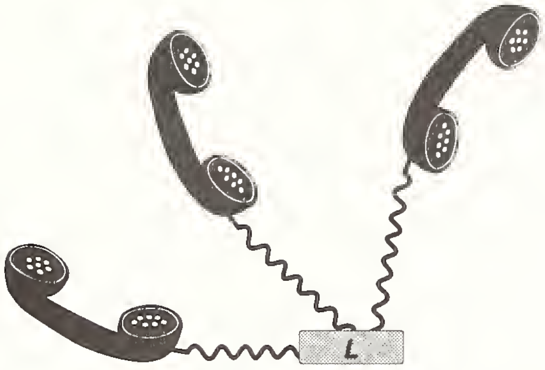
Computing Communications

News from UTCC

Telephone Tips



Has this happened to you?

1. You're on the telephone with someone and you need to check something with someone else. You get up from your desk and run to another telephone to call the second person. After hanging up, you run back to your desk and to your call with the first person.
2. You want to schedule a meeting with two other people. A call to Person 1 is placed and the meeting is scheduled for Monday morning. You call Person 2 and try to schedule the meeting for Monday morning, but Person 2 is busy then but is available on Tuesday morning. You know you are available on Tuesday morning, but you're not sure if Person 1 is. You tell Person 2 you will check with Person 1 and call back.
3. You have received a call that should be handled by someone else in your group. You tell the caller to telephone that person at 978-XXXX.

The time wasted and frustration created by these situations can be eliminated with the press of a button. Every telephone at the University of Toronto is equipped with a feature called "Consultation Hold/ Conference 3/Call Transfer."

"Consultation Hold" allows you to consult privately with a second party (inside or outside the University's telephone system) while your first call is on hold. To do this, press the "L" or "link" key once on the Unity set. You will hear three quick beeps followed by the dial tone. Key in the telephone number of the person you wish to consult. You are now connected to the second person and the first is on hold. To return to the original caller, press the "L" key. If the number is busy or there is no answer when you call the second person, press the "L" key to return to the original caller.

"Conference 3" allows you and two other people (inside or outside the University's telephone system) to be connected to the same telephone conversation. To establish a "conference 3" call, call one of the parties involved in the conference call. To put this person on hold, press the "L" key once. You will hear three quick beep tones, followed by the dial tone. Key in the telephone number of the other conferee you wish to add to the call. Once that person has answered, press the "L" key and all three parties will be connected.

"Call Transfer" allows you to transfer a call to another telephone inside the University's telephone system. To transfer a call, press the "L" key once. You will hear three quick beep tones followed by the dial tone. Key in the telephone number of the person to whom you wish to transfer the call. You are now connected to the second call while the first is on hold temporarily. Press the "L" key again to connect all three parties. To complete the transfer, press the "R" or "Release" key.

All of these features can be used on the Electronic Business Set or Meridian Business Set. Instead of using the "L" key, the "Conf 3" key will do the same thing. You will not disconnect or "lose" anyone on the line as long as you use the "L" or "Conf 3" keys.

The next time you need to talk to more than one person at a time, try using this feature. It should save you time and frustration.

Debbie Stewart
Voice Communications

Annual Report

The Department of Planning and Coordination has prepared an Annual Report outlining projects completed by all departments in the Division of Computing and Communications during the 1990/91 fiscal year. The Report will be available mid-June, and will be circulated to Principals, Deans, Directors, and Chairs of departments. If you do not receive a copy but would like to see one, call Eva Swenson at 978-5138, or send electronic mail to the address below.

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Packard Bell PACK-MATE 386XH

David Sutherland
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At less than $2000, the PACK-MATE 386XH offers 80386 compatibility for those on a budget. The machine is based on a motherboard made by Intel. We examined the motherboard and found it to be of good quality, with a custom chip set developed by Intel to implement most of the functions needed to create an AT-compatible computer. The computer's basic input/output system (BIOS) came from Phoenix Technology.

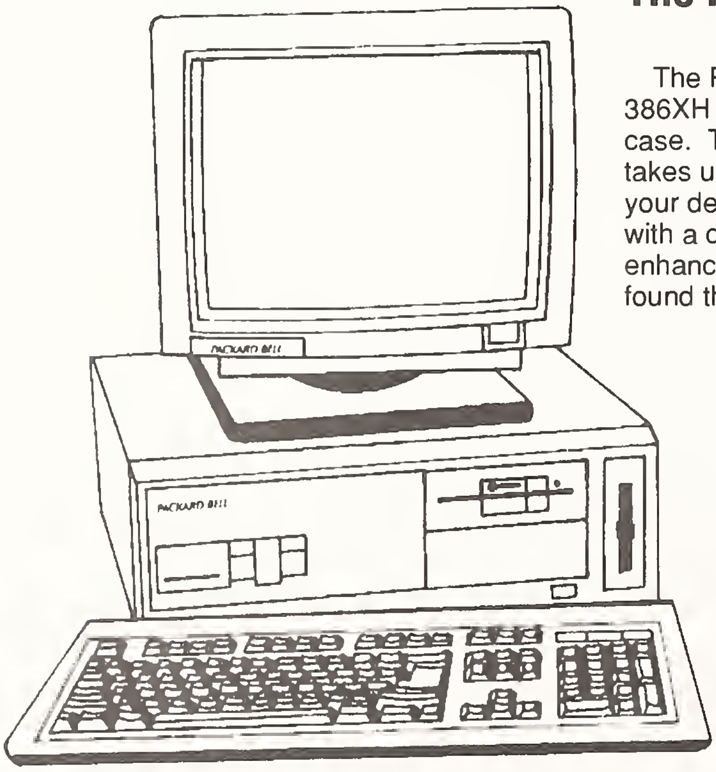
The technical features of this computer are:

- One 16 megahertz (MHz) 80386SX central processing unit (CPU);
- Two megabytes (MB) of Random Access Memory (RAM);
- One parallel port, two serial ports, one mouse port;
- One 130MB Intelligent Drive Electronics (IDE) hard disk;
- One 1.2MB floppy disk drive;
- One 1.44MB floppy disk drive;
- One 16-bit video graphics array (VGA) card with 800 x 600 pixel resolution using the OAK technology VGA chip;
- One 2400 baud internal modem;
- One PS/2 compatible mouse.

The expansion capabilities of the computer are:

- 8MB of RAM on motherboard;
- One 80387SX coprocessor;
- Two 16-bit full length slots;
- One 5.25 inch device bay and power connector.

The PACK-MATE 386XH



The Hardware

The PACK-MATE 386XH has a low-profile case. This means that it takes up less space on your desktop. It comes with a compact, (101-key) enhanced keyboard. We found the touch to be mushy, but some people have assured us that this is just the type of keyboard they prefer.

Norton Utilities' System Information program reported values of:

CPU index: 10.2
Hard disk index: 6.4
Performance index: 8.9

The Coretest utility found a data transfer rate of 812.3 kilobytes per second and average access time of 19.0 milliseconds.

Included in the evaluation package was a Packard Bell 8531 colour VGA monitor, which performed well. The image was stable and well-focussed, colours were rich, and there was a good range of contrast and brightness.

Software

The PACK-MATE 386XH comes with version 4.01 of the MS-DOS operating system on a 5.25-inch diskette. A diskette with diagnostic programs and a diskette for the VGA card are also provided. The latter diskette contains utility programs and high-resolution drivers for applications software like Lotus, Windows, AutoCAD, and so on.

Packard Bell includes a copy of Lotus Works in the package. Lotus Works integrates word processing, spreadsheet functions, database management, graphics, and modem communications in one program. Unfortunately, the Lotus Works program is not actively supported by UTCS. If you are using it, there is a risk of not being able to get the technical assistance you need to solve a problem.

Documentation

The documentation that accompanies the PACK-MATE 386XH is notable for the addition of a VHS video tape that demonstrates how to connect the keyboard, mouse, monitor, and power cables to the computer, and how to format floppy diskettes using the MS-DOS shell utility. We would have preferred to see the video tape provide more focus on the hardware, perhaps demonstrating removal of the cover and installation of an adapter card. Many people should find this tape to be sufficient for the purpose of "plugging in the computer."

The computer also comes with the standard *MS-DOS 4.01 User's Guide, User's Reference, Shell User's Guide & Reference, GW-Basic Reference,* a *Quick Start Guide,* the *386XH User's Manual,* a *PBVGA Multi-Mode Video Card Manual,* a *Mouse User's Guide,* and a *Modem Reference Manual.*

The *Quick Start Guide* offers instruction on topics such as:

- What is a Computer?;
- Setting the System Up;
- Starting the System for the First Time;
- What if Things Aren't Going Right?;

plus appendices covering the most common MS-DOS commands and trouble-shooting tips.

The *386XH User's Manual* covers the installation and maintenance issues, offering specific information on the computer's specifications, upgrading system memory, configuring the hard disk, adding adapter cards, interpreting system error messages, and running the diagnostic programs.

Performance and Compatibility

We tested a variety of standard MS-DOS programs (WordPerfect 5.1, dBASE IV, ProComm, Lap-Link, and so on) on the PACK-MATE 386XH and did not encounter any compatibility problems.

Windows 3.0

We installed and ran Windows 3.0 in both standard mode and 386 enhanced mode without difficulty. We tested Word for Windows, PageMaker 3.0, and CorelDRAW, three Windows-specific programs that make extensive demands on a computer's resources. The PACK-MATE 386XH had the power to run both Word for Windows and PageMaker at a comfortable pace. We found the PACK-MATE's performance with CorelDRAW to be adequate for occasional use, but too slow for using the program regularly to create complex graphics. Using a diagram created in CorelDRAW, we measured the following times for redisplaying the screen:

Turning Preview select on: 42 seconds;
Turning Preview select off: 19 seconds.

SAS

The SAS compatibility test suite, Testbase, provides an excellent measure of a computer's performance and compatibility. The Testbase test suite is a mix of both CPU and disk-intensive procedures. No errors were encountered during the testing, and the PACK-MATE 386XH posted times as follows:

No EMS memory active:	18 minutes, 2 seconds;
EMS Memory active:	13 minutes, 19 seconds.

Networking

A Western Digital 8-bit Ethernet card was installed in the PACK-MATE. With it we successfully operated the computer on the UTCS local area network, logging into our Novell server, our UNIX host, and IBM mainframe computer. The serial communications ports operated successfully at 115.2 kilobytes per second using the Lap-Link file transfer program.

Conclusion

The PACK-MATE appears to be a well-made computer. The use of the Intel motherboard suggests that there should be very few compatibility problems with the unit. We see this machine being appropriate for general office applications where the primary uses are word processing, databases, and simple mathematical work such as spreadsheets.

Adding an additional 2MB of RAM would turn the computer into an adequate Windows 3.0 workstation. Equipped with a mathematical coprocessor and additional memory, this computer would also be suitable for running more complex mathematical programs such as Lotus 1-2-3 version 3.1 and SAS.

The combination of performance, expandability, 386 compatibility, and low price make this computer worth considering.

For more information, call David Sutherland at 978-5426.

Packard Bell Force 386/33

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Every month we read announcements of new programs that place increasing demands on the amount of memory, disk storage, and speed of our computers. The specifications for a "minimum system" for most programs do not yet recommend a computer running with a 33 megahertz (MHz) 80386 processor, four megabytes (MB) of Random Access Memory (RAM), and a 120MB hard disk. But soon they will.

Machines of such power can now be purchased for under $4000, much less than the price of the original IBM PC computer. The Packard Bell Force 386/33 is an example of a high performance computer with a low price. The popularity of this type of machine will encourage software developers to write programs with features that will utilize the hardware.

The technical features of this computer are:

- A 33MHz 80386 DX central processing unit (CPU);
- 64 kilobytes (KB) memory cache; 4MB of RAM;
- One parallel port, two serial ports;
- One 130MB Intelligent Drive Electronics (IDE) hard disk;
- One 1.2MB floppy disk drive;
- One 1.44MB floppy disk drive.

The expansion capabilities of this computer are:

- 8MB of RAM on the motherboard;
- One 80387SX coprocessor;
- Five 16-bit full-length slots;
- Two 16-bit slots with 32-bit extensions;
- One 8-bit slot;
- Three 5.25-inch device bays and one power connector.

Note: One 16-bit slot is used by the disk interface card. One slot will be used by a graphics adapter card. This leaves six slots available for adapter cards.

The Hardware

The Force 386/33 is a large desktop unit. A stand for vertical mounting is included with the machine. Five screws secure the cover to the chassis. Both the chassis and cover are metal, providing good radio frequency (RF) shielding, and a solid foundation for the installation of heavy disk and tape drives. Packard Bell also provides extra screws and mounting rails for installing a second hard disk, a CD-ROM player, or a tape drive. Having them supplied with the computer makes upgrading the machine a little easier.

The Force 386/33's power supply offers the following range of power:

- 23 amperes on the 5 volt line;
- 8.0 amperes (12 amps for 12 second burst) on the +12 volt line;
- 5 amperes on the -5 volt line;
- 5 amperes on the -12 volt line.

This much power can generate a lot of heat. The Force 386/33's cooling is augmented by a fan located above the memory chips. This additional cooling of the motherboard is important in situations where many adapter cards and extra memory have been installed in the computer.

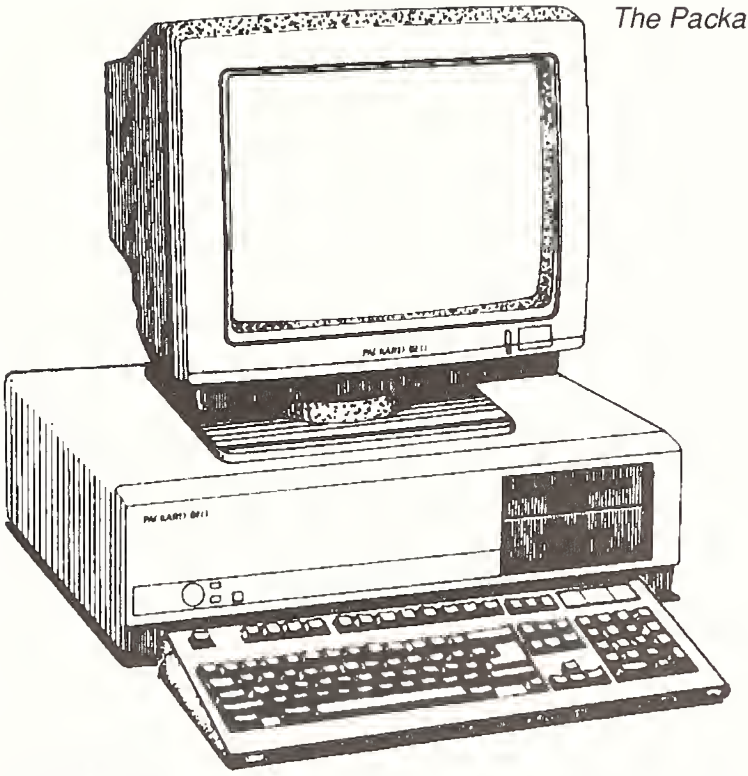
We ran some simple benchmark utilities to get a quick impression of how fast the computer operates. The Norton Utilities System Information (SI) program reported values of:

CPU index:	40.2
Hard disk index:	5.9
Performance index:	28.7

The Coretest disk performance utility indicated an average seek time of 21.9 milliseconds and a transfer rate of 955.9KB per second.

The keyboard is a full-sized (101-key) enhanced unit with the function keys along the top.

Packard Bell included a TriSync PB8510SV colour monitor as part of the evaluation package. The monitor supports resolutions from 640 x 480 to 1024 x 768 pixels. While not exhibiting as great a range of brightness and contrast as some monitors, it was a serviceable unit for both graphic and text-oriented applications.



The Packard Bell Force

Software

The computer comes with MS-DOS Version 4.01 and includes copies of all the Microsoft documentation. Packard Bell provides a copy of their own Diagnostic utility diskette, which is used to test the various components of the computer.

Packard Bell includes a copy of Lotus Works in the package. Lotus Works integrates word processing, spreadsheet functions, database management, graphics, and modem communications in one program. Unfortunately, the Lotus Works program is not actively supported by UTCS. If you are using it, there is a risk of not being able to get the technical assistance you need to solve a problem.

Documentation

The *386/33 User's Manual* is written clearly and uses many illustrations and tables. The manual covers the following areas:

- installation and assembly instructions;
- directions for upgrading memory, hard disk, coprocessor;
- trouble-shooting tips and interpretation of system error messages;
- memory configuration;
- hard disk specifications;
- jumper settings and connector pin assignments.

The *Quick Start Guide* is a general guide to setting up and using the computer (see the Packard Bell 386XH review in this issue for more details).

Lastly, Packard Bell provides the complete set of MS-DOS manuals: *MS-DOS User's Guide and User's Reference, GW-Basic User's Guide and User's Reference,* and the *Shell User's Guide and User's Reference.*

Performance and Compatibility

We installed and tested a variety of standard MS-DOS programs such as WordPerfect, dBASE, and SAS, and encountered no problems using any of the software. A machine of this performance capacity is especially appropriate when there are a lot of graphics or calculations to be done. So, we investigated the computer's ability to run Windows 3.0 and SAS.

Windows 3.0

Windows 3.0 was configured to run on the UTCS Novell network and used the standard 640 x 480 pixel video graphics array (VGA) display. With Windows applications like PageMaker 3.0, Word for Windows, and CorelDRAW, we found the response time of the computer to be quick. Often we could not detect any delay. Our CorelDRAW test graphic had screen redraw times as follows:

Turning Preview select on: 20 seconds;
Turning Preview select off: 6 seconds.

Many people wonder about the value of adding extra memory to their computer since they have heard that MS-DOS can only use 640KB of RAM. One of the advantages of Windows 3.0 with an 80386 chip in the computer is that you can use additional memory. The additional memory can be used for two things. Programs that have been created according to the Windows 3.0 specifications can use memory greater than 640KB directly. This capability increases the amount of data that a program can process, and improves performance by loading more of program's functions into the additional memory. Windows 3.0 can also use the additional memory to keep several programs active at the same time. This is called multitasking. With multitasking you can quickly switch to another program without having to exit the program you are using.

Since the computer was equipped with 4MB of memory, we experimented with Windows' multitasking capabilities. We loaded our Telnet program that provides access via the UTCS local area network to our

UNIX host. Then we started working on a document in PageMaker 3.0. Switching between our UNIX session and the PageMaker document took four to six seconds, much faster than exiting and reloading the programs.

SAS

The computational power available in the Force 386/33 equals the capabilities of minicomputers a decade ago. As a result, the convenience and economy of a personal computer running SAS for statistical analysis persuades many researchers to purchase a machine.

We evaluated the Force 386/33 using the SAS Testbase compatibility suite. Testbase thoroughly exercises the computer, placing demands on the machine's ability to do speedy calculations and gain access to information quickly on a hard disk. No errors were encountered during the test, and the following times were recorded:

No EMS memory active: 16 minutes, 8 seconds;
EMS memory active: 8 minutes, 47 seconds.

Networking

The Force 386/33 has the power to function as either a high-performance network workstation or a low-cost Novell server. We tested the unit as a network workstation and successfully logged into the UTCS Novell network. While logged into the network, we ran both Windows 3.0 and standard MS-DOS applications without difficulty.

Using the Telnet program to provide TCP/IP access, we connected to both a UNIX minicomputer and the IBM mainframe.

Our evaluation of the computer did not include setting it up as a Novell file server, although Packard Bell informs us that the machine has received Novell certification for use as a file server.

The LapLink file transfer program was successfully used to transfer 15MB of data at 115 kilobaud using the serial port.

Conclusion

Packard Bell computers have a mixed reputation around the University. Some people love them. Others have had problems with reliability and the lack of standardization of the various components used to assemble the computer. Packard Bell representatives insist there is a commitment to products assembled with mainstream parts. The Intel motherboard offers some assurance of quality with respect to compatibility and reliability. The Force 386/33 offers good performance at an economical price.

For more information, contact David Sutherland at 978-5426.

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NEC PC-VCR

Terry Jones
tj@gpu.utcs.utoronto.ca

A Computer-Controlled, Frame Accurate VCR

The NEC PC-VCR is a Super VHS (S-VHS) video cassette recorder with a built-in computer interface. Through this interface you can control all the functions of the VCR remotely. As well as being computer controlled, the NEC PC-VCR is frame accurate. It has four heads for very clear freeze frames (stills), and a flying erase head for very clean editing. The fact that it is S-VHS makes it compatible with all VHS tapes presently available. If the rest of the video equipment you use is S-VHS compatible, then you can take advantage of the higher picture quality available with this format.

The computer interface on the PC-VCR consists of a standard RS-232 serial port on the back of the unit. You can order the PC-VCR with either a Macintosh or a PC serial cable. The computer communicates simple text commands to the VCR: for example, PL to play, FF for fast forward, PS for pause. The VCR sends back status messages so you can monitor the progress of the commands you send.

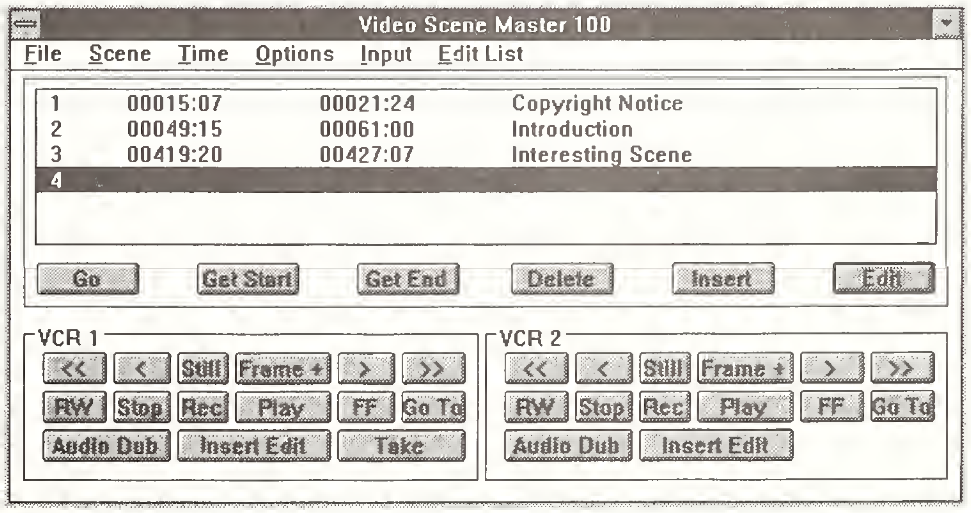
A VCR that is frame accurate is able to jump to a specified position on the tape. This position is measured in hours, minutes, seconds, and frames. There are 30 frames to a second of video. Most home VCRs are only capable of getting "close" to a particular spot on a tape, usually within one second or 30 frames. The NEC PC-VCR can accurately and repeatedly jump exactly to a particular frame on a video tape. It can do this because NEC uses a proprietary system to record the frame numbers on the tape. These frame numbers are not visible, do not affect video or audio on the tape, and can be added to any tape at any time (even to prerecorded tapes with the protection tab removed). Because the NEC PC-VCR is frame accurate, you can instruct it to go to any particular frame on the tape, then show that frame as a still image, or play a certain number of frames starting at that point. When you instruct the unit to go to a particular frame, it checks its current position on the tape, then goes to the requested spot using either Fast Forward, Play, or Rewind (whichever is fastest in relation to how far and the direction it has to jump).

NEC PC-VCR and Multimedia

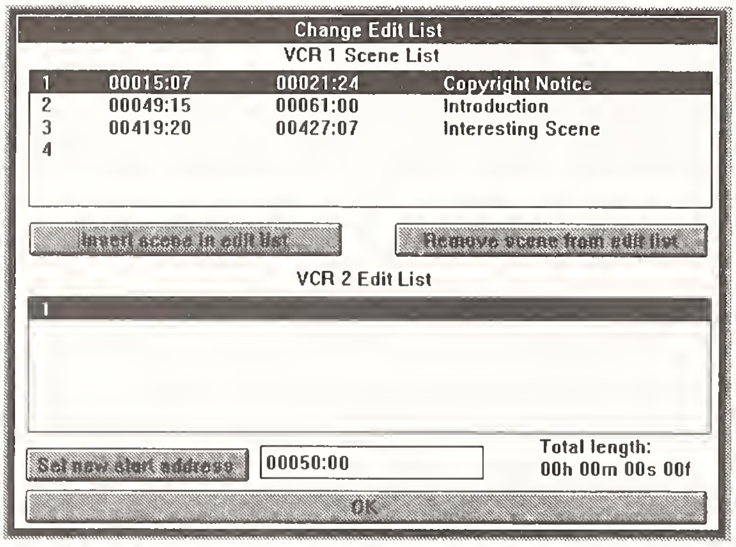
These features, along with software available for both the PC and the Macintosh, make the PC-VCR a powerful tool for multimedia applications that involve video.

There are programs for both the Macintosh and the PC that work with the NEC PC-VCR. **Aldus Persuasion** is a Macintosh presentation package that can interface with the PC-VCR, allowing you to use video segments in your presentation. **MediaMaker,** also for the Macintosh, will shortly have a link to the unit. MediaMaker will let you bring together sound, graphics, computer animations, and video segments. When you have arranged all the pieces, you "Print" to video, creating a video tape as the finished product. A program for the PC, called **Video Scene Master,** comes in two forms, a plain DOS form and a Windows form. The Windows form of Video Scene Master allows you to control two PC-VCR players to edit video tapes. Using your PC to control the "source" player, you select scenes from the source tape. When you have the scenes you want in the order you want, you can create a new tape with only those scenes in the selected order. You can also replace the audio at the same time.

Scene Master for PC Windows turns your PC with two NEC PC-VCRs into an editing suite.



```
1      00015:07      00021:24      Copyright Notice
2      00049:15      00061:00      Introduction
3      00419:20      00427:07      Interesting Scene
4
```



Change Edit List

VCR 1 Scene List

1	00015:07	00021:24	Copyright Notice
2	00049:15	00061:00	Introduction
3	00419:20	00427:07	Interesting Scene
4			

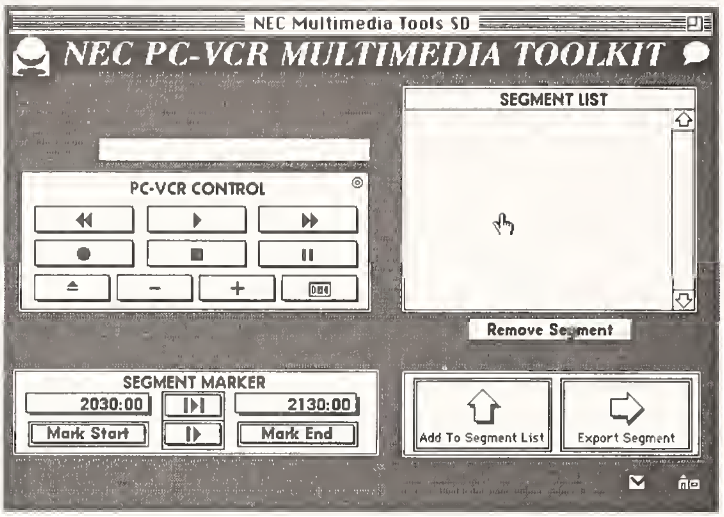
VCR 2 Edit List

1

00050:00

Total length:
00h 00m 00s 00f

The edit list screen from Scene Master.



One of the Macintosh HyperCard development stacks for the NEC PC-VCR.

If you want to develop your own custom programs to control the PC-VCR, you can use toolkits for doing HyperCard and SuperCard development work on the Macintosh, and ToolBook development on the PC. The Macintosh HyperCard multimedia toolkit allows you to use the computer to control the VCR to select a segment of video. You can then easily create a HyperCard button and paste it into your own HyperCard stack. When you click this button, the PC-VCR will find and play that segment of video.

The PC ToolBook toolkit is not as rich as the Macintosh kit. There are routines that provide communication with the PC-VCR, plus a ToolBook book that allows you to create and test scripts of commands to be sent to the VCR, but it is not as simple to create a button that plays video. To make things a little easier, UTCS has written a ToolBook template that will let you do this. Other presentation programs (e.g., Persuasion) can also control the NEC PC-VCR, and by the time you read this, more will be available.

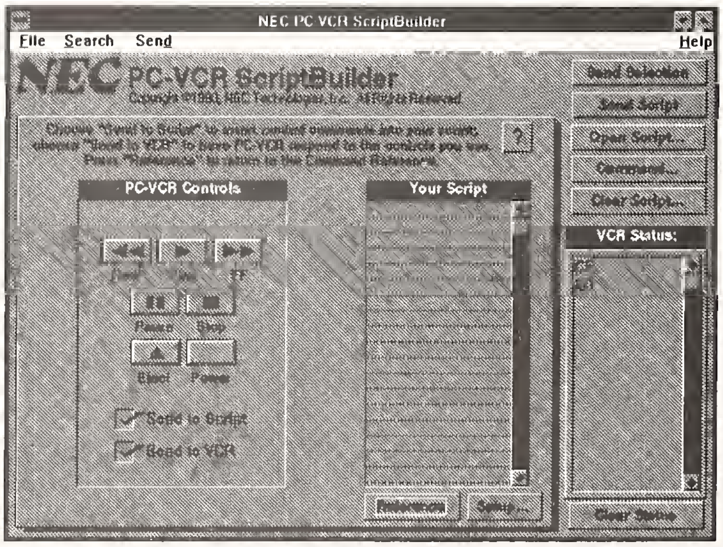
For multimedia applications, the unit is almost always compared with a video disc player. Using a tape means that jumps on the PC-VCR are relatively slow when compared with a typical video disc jump. Tapes take a long time to rewind or advance, whereas video disc players can jump to any particular spot on a disc in less than one second. Where the PC-VCR shines, however, is in its alterability. Tapes are very inexpensive to produce and easily changed. It costs hundreds of dollars to produce a single video disc that cannot be changed once produced. The PC-VCR is also useful in producing prototype applications for later mastering on video disc.

While most of the sophisticated applications will involve a computer, you can use the PC-VCR by itself quite effectively as well. If you want to show your audience certain parts of a video tape, you can make a list of the starting addresses of these parts, then use the front panel controls or the hand-held remote to instruct the PC-VCR to jump to a specified point. No more fumbling with fast forward and reverse in front of a hundred restless people.

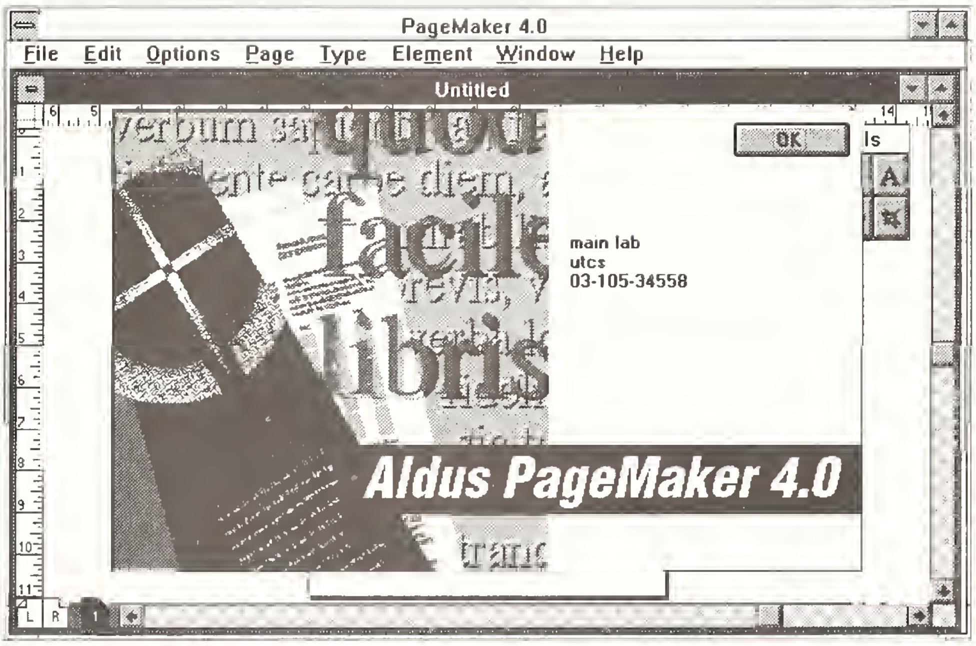
The PC-VCR costs approximately CDN$3000, which makes it too expensive for home use, but considerably less expensive than a professional industrial tape unit. Although the price tag is higher than that of a video disc player, the increased cost of creating master video discs in effect makes video disc players more costly.

UTCS has a NEC PC-VCR on short term loan if you wish to see a demonstration. Contact Terry Jones at 978-4924 for more information or to arrange a demonstration.

One of the PC ToolBook development tools.



What's New in PageMaker 4.0 for the PC?



Harriet H. Ji
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Those of you involved in desktop publishing may have heard about the long waiting period for the PC version of PageMaker 4.0. Well, you need wait no longer. Aldus Corporation began shipping PageMaker 4.0 for Windows in early April 1991.

PageMaker 4.0 on the PC runs under Microsoft Windows, requiring Windows version 3.0 and a 386-class PC. (The 286-class machines have proven to be too slow for Windows and Windows-based programs.) Because of its more powerful word-processing capabilities, more sophisticated formatting and typographic controls, better management of long or multi-chapter publications, and greater support for professional tasks, it is worthwhile for version 3 users to upgrade to PageMaker 4.0.

More Powerful Word-processing Capabilities

A long-awaited improvement in PageMaker 4.0 is its much more powerful word-processing features for text entry and editing. Users of earlier versions may well remember the program's limitations in doing word-processing tasks. Although PageMaker 3.0 offered a Text-tool to accomplish simple text entry and editing, it did not have such common word-processing features as search and replace, spelling checking, indexing, and table of contents generation. With version 3.0 you had to prepare long stories in your word processor and import them into PageMaker using the Place command. PageMaker 4.0 has addressed these shortcomings by including a built-in word processor, called the Story Editor, for complicated text jobs.

When you are working with text in PageMaker 4.0, you can still import documents prepared in separate word-processing programs and use the Text-tool to type and edit simple text in the traditional page view — the "layout view" as it is termed by PageMaker. However, you can also choose to use the Story Editor to open a "story window" on top of the layout view. You can type, edit, search and replace, apply styles, or spell check your text as if working in a separate word processor.

The story window provides a clear view of text for quick and easy editing without affecting text formatting. You can choose to display a sidebar in the story window to show styles used for each paragraph. You can also open more than one window in the story view in order to to cut and paste between different stories.

You can check your spelling and hyphenate words automatically using the 100,000-word dictionary provided by the Story Editor. You can use up to 13 dictionaries at any one time for other languages such as French or German, or for medical or legal documents.

The Story Editor provides Find and Change features for searching or replacing text, fonts, point sizes, type styles, paragraph styles, and nonprinting characters such as tabs and paragraph marks. These features enable you to reformat long publications more efficiently.

Once you are satisfied with the text, you can close the story window to place the text back in the layout view. By switching between the layout view and the story view of the same text, you can take advantage of both. The traditional layout view is good for page designing and typesetting. The story view is helpful for text typing and editing.

Improved Controls for Graphics and Text

PageMaker 4.0 has more sophisticated controls for integrating and controlling text and graphics in one publication. You can import and display colour images in PageMaker 4.0, including 24-bit colour TIFF and Encapsulated PostScript (EPS) graphic images. In addition to placing independent graphics next to your text blocks in a variety of ways, you can now also place a graphic inside a text block, creating an "inline graphic" where the text and graphic are treated as one unit.

There are new controls for text as well. You can add horizontal lines above and below paragraphs or use the widow/orphan control to keep paragraphs from breaking across columns or pages. The new "rotate text" feature in PageMaker 4.0 allows you to rotate text in 90-degree increments. You can stretch and condense characters from 5% to 250% of the original font design. You can also control, with greater flexibility, the size and position of text that has had superscript, subscript, and small caps formatting applied.

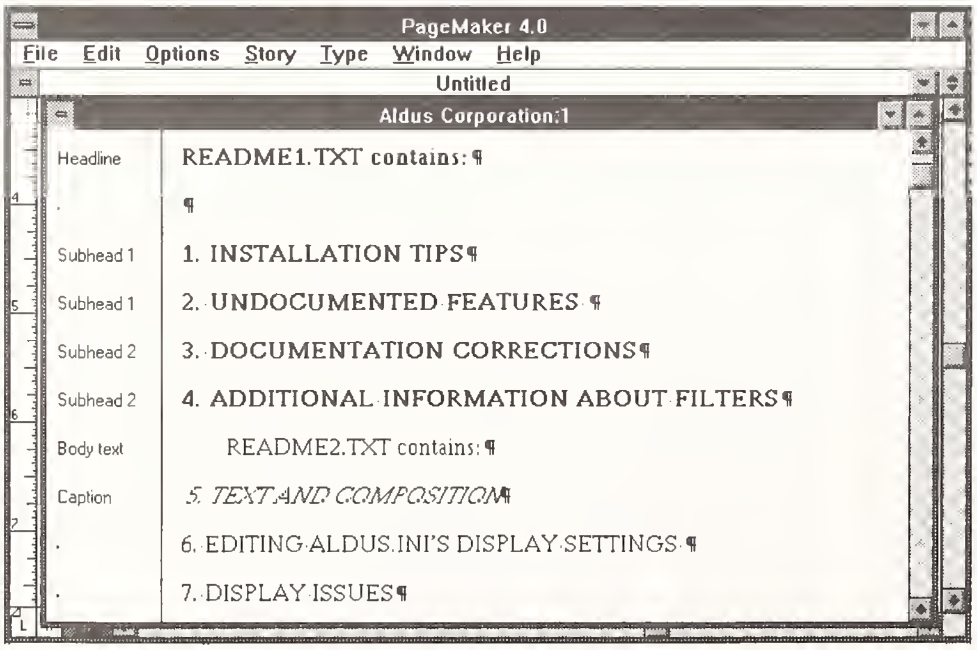
Better Management of Long and Multi-chapter Publications

PageMaker 4.0 has expanded its features for working with long and multi-chapter publications. A single publication in PageMaker 4.0 can now contain up to 999 pages, depending upon available hard disk space. The new "Book" command in the File menu enables you to work on a "book" made up of a number of PageMaker publications.

You can link one publication to several others through the Book command. Once linked, you can automatically generate a table of contents for a book consisting of several publications or for just a single publication. You can create, edit, and cross-reference an index with up to three levels per entry for a single or a multiple-chapter book.

With one command, you can print all the publications connected to one book. With the Automatic Page Numbering feature, you can have each publication repaginated in a multi-chapter book.

PageMaker's Story Editor allows you to enter and edit text, check spelling, apply styles, and much more.



Headline	README1.TXT contains:¶
.	¶
Subhead 1	1. INSTALLATION TIPS¶
Subhead 1	2. UNDOCUMENTED FEATURES ¶
Subhead 2	3. DOCUMENTATION CORRECTIONS¶
Subhead 2	4. ADDITIONAL INFORMATION ABOUT FILTERS¶
Body text	README2.TXT contains:¶
Caption	*5. TEXT AND COMPOSITION¶*
.	6. EDITING ALDUS.INI'S DISPLAY SETTINGS ¶
.	7. DISPLAY ISSUES¶

More Support for Professional and Business Tasks

PageMaker 4.0 has been made a better tool for professional and business publications. The "Link" and "Import" commands in the new version expand its capabilities to integrate materials created in other software.

You can import spreadsheets, charts, data, and graphics created in business-oriented programs (such as Lotus 1-2-3, Microsoft Excel, Symphony, and dBASE III or IV) into your PageMaker 4.0 publications.

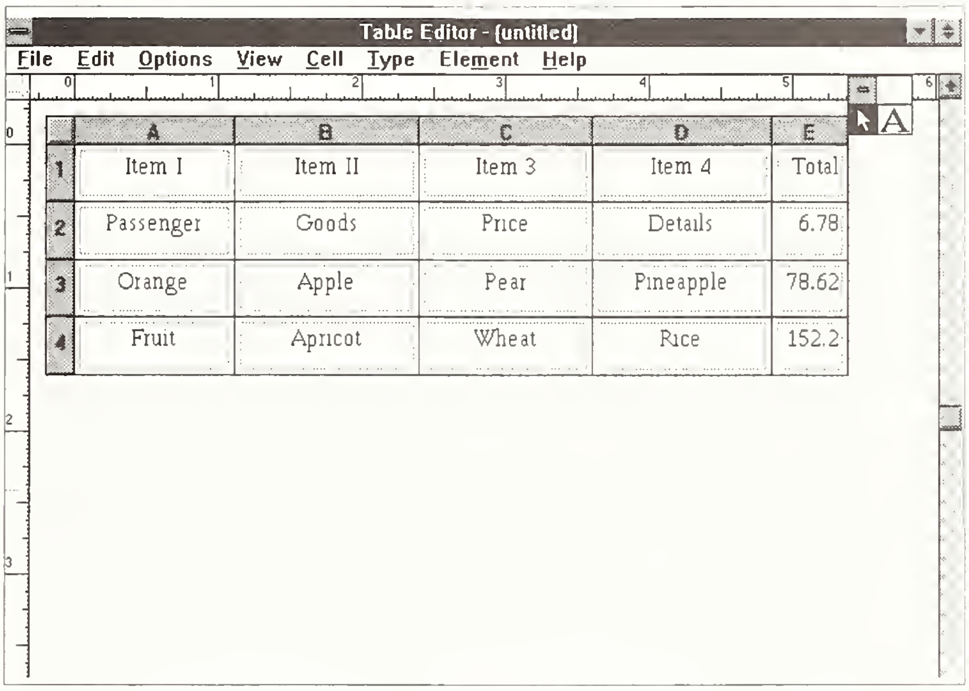
After placing documents into your PageMaker publications, you can use the "Links" command to link the placed versions to their original files outside PageMaker. Any change you make to the external text, graphics, database, spreadsheet or table files at a later time can be automatically passed to the linked versions of these files in your publication. The program will also tell you when each file was placed in your publication and when it was last modified.

Professional Templates

PageMaker 4.0 has supplied more than 35 new templates to help with quick designing of such publications as business cards, memos, newsletters, and others business-related items.

Table Editor

PageMaker 4.0 comes with a separate program called Table Editor. It allows you to design and edit tables, charts, and schedules, and import them easily into your PageMaker publications. The Table Editor can also convert Lotus and Excel spreadsheets into tables automatically.



	A	B	C	D	E
1	Item I	Item II	Item 3	Item 4	Total
2	Passenger	Goods	Price	Details	6.78
3	Orange	Apple	Pear	Pineapple	78.62
4	Fruit	Apricot	Wheat	Rice	152.2

The Table Editor allows you to design and edit tables, charts, and schedules.

Similarity between PageMaker 4.0 on PC and Mac

In today's publishing world, you often face the problem of switching between PC and Macintosh computers for your desktop publishing jobs. You won't have much trouble transferring your skills in PageMaker 4.0 on the PC to its counterpart on the Mac. The two versions are quite similar, except for some minor differences in their working environments (Windows versus the Macintosh desktop) and in their keyboard layouts.

If you are familiar with PageMaker 4.0 on the Macintosh, you won't have trouble using it on the PC. All you need to do is familiarize yourself with the Windows environment and the keyboard on PC. For instance, instead of clicking on the PageMaker icon on the Mac with your mouse, you should type "win" to start your Windows version on the PC before clicking on the PageMaker icon in the Windows desktop. You should also remember that the Command key on a Mac keyboard is replaced by the Control key on a PC keyboard. There are also some minor differences in the menu bars of the two versions, such as the commands controlling printing and help.

Conclusion

PageMaker 4.0 is a much-welcome upgrade to a popular desktop publishing package. Version 3.0 users will find it worthwhile to upgrade to the new version. New users will delight in the comprehensive set of tools for desktop publishing. For more details of PageMaker 4.0 for the PC, contact Harriet Ji at 978-6050.

MacKermit version 0.98(62) Now Available at UTCS

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Kermit is the name for a computer protocol by which data is transferred from one computer to another. Developed at Columbia University, Kermit is non-proprietary, well-documented, and widely-used.

At UTCS, we distribute and support a program called "MacKermit" that runs on the entire Macintosh family. Also developed at Columbia University, MacKermit is a package that integrates communications and the file transfer protocol Kermit. The latest version supported by UTCS is 0.98(62). MacKermit sports many of the features found in other programs using the Kermit protocol, but with the additional ease-of-use that is typical of applications running under the Macintosh user interface. MacKermit supports either VT100 or VT102 terminal emulation at speeds up to 9600 bits per second and file transfer speeds up to 57.6 kilobits per second.

There are three major pull-down menus: File, Settings, and Remote.

Summary of New Features in MacKermit 0.98(62)

- Multinational character sets
- Recording of online-session statistics (Log menu)
- Transfer directly to applications
- File transferring using MacBinary format
- Choice of port (printer or modem port)
- Variable screen options (Settings menu)
- Extensive editing options
- Ability to end short or long BREAK - manually or from Edit menu
- Ability to use key macros (Settings menu)

File Menu

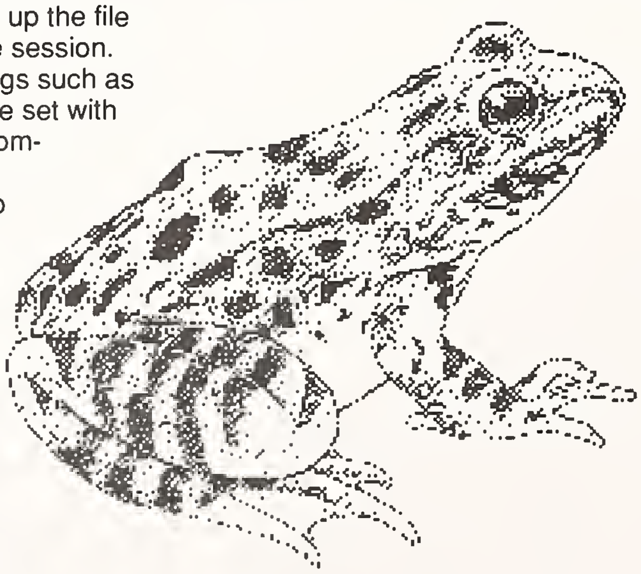
The File menu includes utilities for both local and online file manipulation. The Load Settings and Save Setting functions allow the loading or saving of customized user-defined MacKermit environments.

New to version 0.98(62) is the capability to transfer files in MacBinary format. Functions added to the File menu include the ability to record statistical information on a file-transfer session, the ability to set the directory to or from where the file transfer is to take place, and the ability to switch to other applications while in MacKermit.

Settings Menu

Under the Settings menu, we find functions to set up or configure MacKermit for an active online session. The File Defaults function enables the user to set up the file transfer settings for the session. Communications settings such as baud rate and parity are set with the Communications command. New to version 0.98(62) is the ability to use either the modem or printer port as the serial port; this function is found under the Communications command also.

The Protocol command enables the user to customize the Kermit protocol transfer specifications such as packet length and block check type. Under Terminal, the terminal screen and cursor can be customized for different settings. Version 0.98(62) accepts eight-bit characters from a remote host and allows variable screen length. A new feature of version 0.98(62) is found under Character Set: standard 7-bit



character sets are available for several national character sets, and 8-bit character sets are available for several International Standard character sets. A communication session is made easier with the setting of keyboard macros, easily accomplished by selecting Set Key Macros under the Settings menu.

Remote Menu

MacKermit also supports Kermit's server function. The Remote menu offers various server commands that can be sent to a Kermit server, or can be used to put MacKermit in server mode.

Other New Features

New to version 0.98(62) is the facility to send a short or long BREAK; these can be sent manually or can be found under the Edit menu. Each online session's transaction statistics can quickly and easily be stored by clicking on the Log menu. Throughout the session, the desk accessories are easily accessible by dragging the MacKermit window to reveal other windows.

Obtaining MacKermit

To obtain a copy of MacKermit 0.98(62), bring a 3.5-inch floppy diskette to the Advising Desk (located at 4 Bancroft Avenue, Room 201) between 12:00 and 6:00 p.m., Monday through Friday. You will receive a copy of the program, a document outlining the keyboard mapping, and three keyboard definition settings.

Support for Mac Plus and Mac 512K Keyboards

Columbia University recommends version 0.8(34) for the 128K Macintosh model. This version for the 128K Macintosh can be obtained at UTCS. Support for the keyboards that come with older model Macs, such as the 512K Mac and Mac Plus, is achieved with special keyboard-definition files. These files have been modified by Advising office staff and come with the versions of MacKermit distributed by UTCS.

Note: As we were preparing this article, Columbia University informed us that they were preparing to release version 1.0 of MacKermit, but were unable to specify a release date. As new versions become available, UTCS will endeavour to obtain and evaluate them. See future issues of *ComputerNews* for more information.

If you have any questions, contact Jon Alexander at *jon@utcs* or 978-6230.

ProComm Communications Program Seminar

ProComm is a general purpose communications program currently available to all U of T faculty, staff, and students. It is suitable for connecting to the many networks on campus.

A seminar has been scheduled to introduce ProComm and its various features: terminal emulation (a number of popular ones will be reviewed); the dialing directory; file transfer protocols, such as Kermit and XMODEM; configuration and modem parameter settings; and the DOS gateway, which allows you to execute DOS commands and other programs while you are still in ProComm.

There is a fee for this seminar. Copies of ProComm are made available at no charge to members of the University, but you must bring your own diskettes (two 5.25" or one 3.5").

To reserve a place in this seminar, please contact Irene Rosiecki at 978-4565.

Free NetNorth (Electronic Mail) Demonstration

Anyone interested in sending documents to colleagues or friends reliably, quickly, and inexpensively will not want to miss this demonstration. We will introduce you to the NetNorth/BITNET/EARN communications network, which is accessible from the CMS system. This network connects more than a thousand universities and research institutes in Europe, Asia, and North America. Sending documents or files over the network is very easy to learn.

We will show you how to send mail and files to another institution, and how to talk directly to someone on the network. ***Please note this is a demonstration only.***

Space is limited. If you would like to attend one of these sessions, please contact Irene Rosiecki at 978-4565 to reserve a place.

EasyPlot - Scientific Plotting and Data Analysis Program

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apindor@vm.utcs.utoronto.ca

EasyPlot is an interactive program for viewing, analyzing, and plotting scientific and engineering data. It provides a powerful graphics environment in which you interact directly with graphs and data.

Using EasyPlot, you can create two-dimensional plots, polar plots, histograms, contour plots, and surface plots, and tailor their appearance to your taste. Additionally, EasyPlot has a data analysis component, which I will discuss in detail below. The program is designed to work with a three-button mouse (although the middle button is not used), but if you do not have a mouse you can use the arrow keys instead.

EasyPlot is fully menu-driven, but all menu functions have noninteractive batch command equivalents. As a result, you can also run EasyPlot in a batch mode by creating a file of these batch commands and submitting the file to EasyPlot. There is also a certain number of batch commands that do not have menu equivalents. They are used mainly for setting EasyPlot defaults, and they are read by EasyPlot from a file named "profile.ep" when you start up.

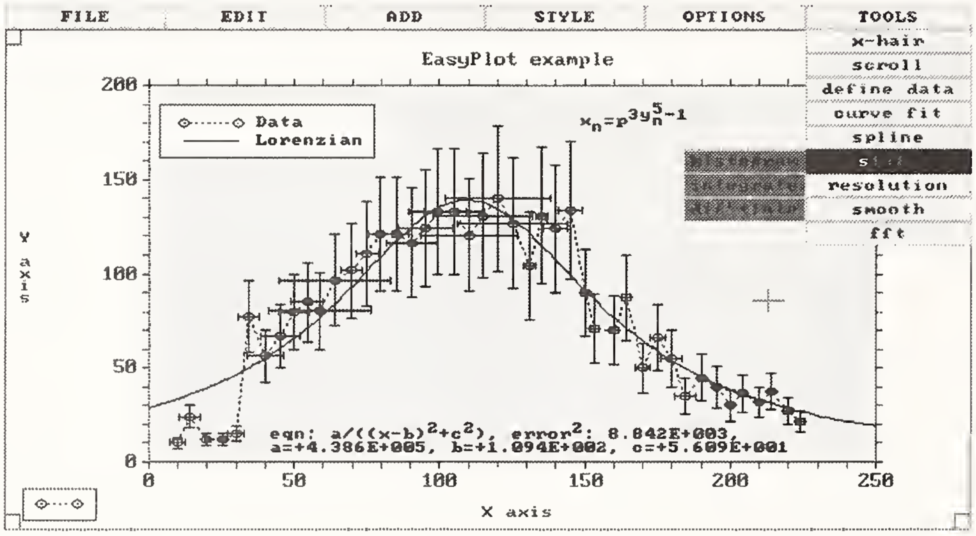


Figure 1

EasyPlot Menu System

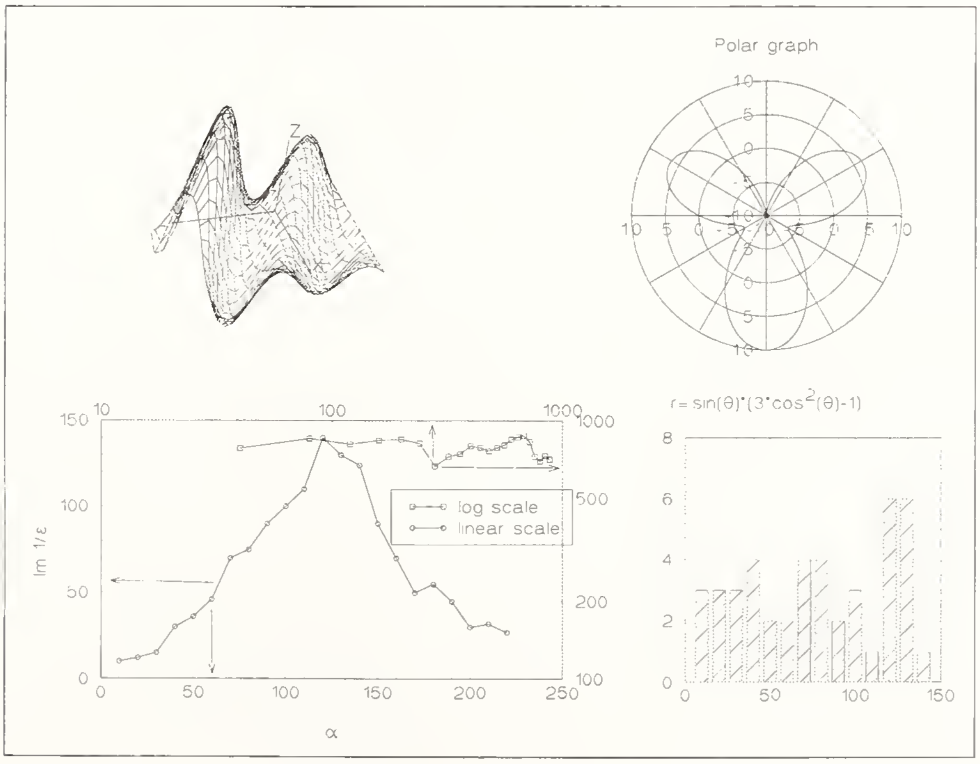
You can see EasyPlot's main menu at the top of *Figure 1*. Selecting any of the items opens a submenu. In *Figure 1* this has been done for TOOLS, where selecting STATS opens another submenu. Items on the main menu have the following functions:

- FILE is used to read external data files or batch command files, and to save files containing either data (created, for instance, by transforming other data or by tabulating a function) or plots in the form of batch commands. Such a batch command file may be used by EasyPlot in a subsequent session to recreate the plot. It is also here that you choose a method of printing a plot (i.e., device driver and destination). Escape to DOS and quitting the program is also done from FILE submenus.
- EDIT serves to edit various aspects of a plot; you can add a title, delete a curve, or modify data. In this last case EasyPlot opens up a data editor, which can also be used to enter data from scratch. The EDIT submenu is also used to transform data (using an equation of your choice), or to move an object on the graph.
- ADD allows you to add objects: another graph, curve, x or y axis, annotation, line (including arrows), or tics. When you choose to add a curve, you either can specify the name of a file from which EasyPlot will read data, or enter an equation which EasyPlot will use to create a set of data for plotting. A full complement of elementary functions is available.
- STYLE is used to change various aspects of a plot from their defaults, such as: whether the points are to be marked and how (including size of marks), whether the points are to be connected and how, whether the error bars are to be shown, what widths the histogram bars are going to have, and so on. EasyPlot allows for 14 different data markers and seven different line styles. There is also an option for three-dimensional (3D) surface fishnet plots (see below).

- OPTIONS allows you to change the range of axes (or select autorange, which is the default), set axes to logarithmic, and put a grid and additional tics on your plot. You can put grid lines and tics at any coordinates.
- TOOLS submenu choices are displayed in *Figure 1*. I shall discuss them in detail:
  - X-HAIR allows you to read the coordinate values of points from the plot.
  - SCROLL is used when you have zoomed in on a part of graph and want to view a different part of the plot without changing the resolution. You can zoom in on any rectangular region of the graph.
  - DEFINE DATA sets instructions for EasyPlot to tell it how to interpret the columns of your data file: which ones are independent and dependant variables, which is a column of error bars (error values can only be specified as fractional percentages), whether the columns represent radius and angle for polar plots, and so on.
  - CURVE FIT allows you to fit any curve to your data. A unique feature of this ability of EasyPlot, which I have not found in any other graphics package, is its animated nature. After you have entered a desired curve and specified initial values for parameters, EasyPlot uses an iterative process to find a solution, and shows you the successive steps in the fitting process. If you decide that the procedure is leading toward a bad solution, you can stop it and start anew with different initial guesses for the parameters. In *Figure 1* you can see a lorenzian fit to the data points, with the values of the parameters and the sum of the squares of errors reported. In the case of a polynomial fit, EasyPlot also reports variance, standard deviation, and covariance matrices. Fitting information and the calculated values can be stored in a file.
  - SPLINE fits the data with cubic splines; the results of the procedure can be saved to a file.
  - STATS allows you to create a histogram, calculate the area under a curve, and differentiate the data.
  - RESOLUTION is used to specify the number of points to be calculated when plotting a curve defined by an equation.
  - SMOOTH is used to smooth data by averaging the data values over a number of neighbouring points (which you can specify).
  - FFT performs Fast Fourier Transform (or inverse FFT), and you have the choice of a Hamming window, Kaiser window, or no windowing at all. You can also compute a complex FFT if you put your data into polar form.

Figure 2 shows four plots combined together, demonstrating the various capabilities of EasyPlot. Note, for instance, two sets of axes in the plot in the lower left-hand corner. One set is linear and the other logarithmic. The same set of data is plotted with respect to both sets of axes. In the upper-left corner of *Figure 2* you can see a surface plot. When you view a surface plot on the screen, you are also presented with a number of buttons that allow you to rotate the surface around various axes, animate rotation, turn perspective on and off, change line widths, and choose one of two algorithms for hidden line removal. In spite of these nice features, the 3D plotting capabilities of EasyPlot leave something to be desired. For instance, you cannot zoom into parts of a surface, and you cannot plot closed surfaces.

Figure 2



EasyPlot supports printing directly to laser printers (HP LaserJet and compatible printers, and PostScript printers), Hewlett Packard Graphics Language (HPGL) pen plotters, and dot-matrix printers (Epson compatible and a number of others). An image created for a specific hard copy device can also be saved in a file. To create *Figure 2,* I saved an HPGL image in a file and printed it later. You also have the option of previewing an image to see what it is going to look like. Sometimes this may be important, since EasyPlot is not a 100% What You See Is What You Get (WYSIWYG) product. For instance, not all Greek letters will display correctly on the screen, only those which are found in the extended ASCII character set. All others appear highlighted on colour monitors. Among other differences between what you see and what you get is the appearance of a y-axis title. On the screen the letters appear horizontally, but on the hard copy they are rotated (compare *Figure 1*, which was created using screen capture, to *Figure 2*). There may also be differences in the relative sizes of legends, titles, annotations, and so on.

In conclusion, EasyPlot is an easy-to-use, flexible, scientific graphics program with good data handling and analysis capabilities. It is also moderately priced (see below). However, if you need to graph 3D data often, you may not get full satisfaction.

EasyPlot is available at UTCS for interested people to try. I also have demonstration diskettes available for distribution. These diskettes have the same functionality as the real program, except that you can neither print graphs nor save files. If you would like to see the program, please call Andrzej Pindor at 978-5045.

Vendor:
Spiral Software
6 Perry St., Suite 2
Brookline, MA 02146
USA
(617) 739 1511

Hardware Requirements:
IBM PC, OS/2 or compatible, with at least 350KB of available RAM;
EGA,VGA or Hercules graphics (EGA card has to have at least 128KB of memory);
Math coprocessor not required, but will be used if present;
Expanded memory will be used if available.

Price:
US$269 (academic discount)

Microcomputer Short Courses

Irene Rosiecki
rosiecki@vm.utcs.utoronto.ca

UTCS offers various noncredit microcomputer courses to faculty, staff, and graduate students of the University of Toronto. These courses cover a number of software programs available for the PC or the Macintosh. Whether you will be typing a thesis on a word processor, or working with spreadsheets, databases, or desktop publishing, we may be able to help you get started.

Our class sizes are small to allow for much individual attention. Continuing support is available upon completion of a course.

The following is a list of the microcomputer courses taught at UTCS:

- Introduction to dBASE IV
- Introduction to Disk Operating System (DOS)
- Electronic Mail Seminar
- Excel on the Macintosh
- Introduction to FoxBASE+/Mac 2.0
- Introduction to HyperCard
- Introduction to Lotus 1-2-3
- Introduction to PageMaker
- ProComm Communications Seminar
- Introduction to SAS on the PC
- Intermediate SAS - Data Processing
- Intermediate SAS - Statistics
- SAS/Graph Seminar
- Microsoft Word on the Macintosh
- Introduction to WordPerfect 5.1
- Advanced WordPerfect 5.1 Topics

To find out about course dates and registration procedures, or to book a place in any of these courses, please contact Irene Rosiecki at 978-4565. Courses are filled on a first-come, first-served basis. The more popular courses fill up quickly, but waiting lists are maintained in case of cancellations.

SYSTAT News

Sandra Gardner
sgardner@vm.utcs.utoronto.ca

UTCS has received SYSTAT version 5.1 for the Macintosh computer, which replaces version 5.0. The major enhancement to the program is that SYSTAT will run on Macintosh computers with at least two megabytes (MB) of Random Access Memory (RAM)—version 5.0 required 4MB of RAM. Version 5.1 can also produce certain graphics and perform numerical calculations faster (e.g., three-dimensional (3D) plots or Pearson correlation matrices).

The minimum application memory size for SYSTAT version 5.1 is 1600 kilobytes (KB). Using all memory available under Finder and MultiFinder, version 5.1 can now analyze larger problems. (For SYSTAT under MultiFinder, you must preset the Application Memory Size before initiating the program.) SYSTAT version 5.0 could only analyze a model with up to 60 degrees of freedom. With 2MB of RAM, SYSTAT version 5.1 can analyze models with 100 degrees. SYSTAT version 5.1 can also handle models with 300 and 400 degrees of freedom with 4MB and 6MB of RAM respectively.

For Macintosh computers with only 1MB of RAM, UTCS still supports SYSTAT version 3.2. This older version is basically command driven and does not have the complete Macintosh interface of SYSTAT version 5.1.

If you do not already have SYSTAT (version 5.0 or 5.1) installed on your Macintosh, you can obtain a license from the UTCS Information Office (see below). If you have any questions about SYSTAT or would like to see a demonstration of Version 5.1, please call me at 978-5128 or send an e-mail message to *sgardner@vm.utcs.utoronto.ca*.

Site License

UTCS offers a site license for SYSTAT on the Macintosh computer to University of Toronto faculty, staff and graduate students. The new annual license fee for both versions 5.1 and 3.2 has been reduced to $70 per installation. The license period is from July 1 to June 30. The manuals for version 5.1 and 3.2 are $58 and $56 respectively. Please bring six formatted diskettes to the Information Desk at 4 Bancroft Avenue, room 201. Your U of T employee number or graduate student number, along with the make, model, and serial number of your computer, are required to register for the site license.

System Requirements

Version 5.1

Hardware Requirements:
Macintosh with 2MB of RAM (or more), a hard disk drive, and System software 6.0.2 or higher.
No Coprocessor Version:
For use on Macintosh Plus, SE, or Classic, with the 68000 processor. Can also run on a Macintosh LC, IIsi, or other Macintosh computers with 68020 or 68030 processors. If there is a 68881 or 68882 coprocessor, SYSTAT will not use it.
Coprocessor Version:
For use on Macintosh II, IIcx, IIx, SE/30. Requires 68020 or 68030 processor and 68881 or 68882 coprocessor.
Hard Disk Requirements:
Approximately 3MB of hard disk space for the application and another 0.7MB for the sample data and help files.

Version 3.2

Hardware Requirements:
Macintosh with 1MB of RAM, two 800KB disk drives or one 800KB drive, and a hard disk. (Both versions described below require 2MB RAM on a Mac II.)
No Coprocessor Version:
No requirements.
Coprocessor Version:
Requires the 68020 processor and the 68881 coprocessor.
Hard Disk Requirements:
Approximately 2.2MB of hard disk space for the application and another 0.5MB for the subroutines, sample data and help files.

Scientific Software Updates

Andrzej J. Pindor
apindor@vm.utcs.utoronto.ca

DERIVE Version 2

Soft Warehouse Inc. has released a major upgrade to its symbolic algebra program, DERIVE. I reviewed an early version of DERIVE in the March 1989 issue of *ComputerNews* (#253), and reported on enhancements available in version 1.5 in the January/February 1990 issue of *ComputerNews* (#260).

The main new feature of version 2 is programmability. You can now add to the built-in functions by writing your own recursive or iterative functions. The conditionals necessary for recursion are implemented by a flexible if-then-else programming construct. Also provided are two general-purpose iteration constructs. Other enhancements include:

- improved exact algebraic solving of equations;
- enhancements to numerical capabilities;
- additional matrix operations;
- better symbolic integrator capabilities;
- additional plotting operations;
- improved user interface;
- revised and expanded documentation;
- utility files: over 200 functions and variables in 23 new or revised utility files that extend the built-in capabilities of DERIVE.

UTCS has only version 1.59 available. If you interested in examining this version of the package, please contact Andrzej Pindor at 978-5045.

New from MathCAD

MathSoft, Inc., developer of MathCAD, is constantly enhancing this popular program for scientific and engineering calculations by releasing Application Packs. These are packages containing MathCAD programs for use in specific fields. In addition to the seven Application Packs available so far (Advanced Math, Statistics I, Statistics II, Electrical Engineering, Chemical Engineering, Mechanical Engineering I, and Mechanical Engineering II), MathSoft recently released three new Application Packs:

1) Numerical Methods Pack (includes ordinary differential equations; partial differential equations; integral equations; special functions; polynomials; applications of contour integration; iterated mappings; testing for primes);
2) Civil Engineering I: Structure and Materials;
3) Civil Engineering II: Soil Mechanics and Hydraulics.

The Application Packs run with MathCAD 2.0 or 2.5 for the PC, Macintosh, and UNIX.

Vendor:
MathSoft Inc.
201 Broadway
Cambridge, MA 02139
USA

Hardware Requirements:
2MB of RAM are recommended for the Macintosh version of all Application Packs, with the exception of the Chemical Engineering Pack, for which 2MB of RAM are required.

Pricing:
US$99 per Application Pack, regardless of platform.

References:
Various aspects of MathCAD were discussed in previous issues of *ComputerNews:*
Pindor, A. "MathCAD 2.0" *ComputerNews,* July/August 1988, #248
Pindor, A. "MathCAD News" *ComputerNews,* January/February 1989, #252
Pindor, A. "MathCAD News" *ComputerNews,* November/December 1989, #259

NAg FORTRAN Library Mark 14 Implemented on the CMS System

Andrzej J. Pindor
apindor@vm.utcs.utoronto.ca

On May 1, 1991 the newest version of the NAg FORTRAN Library, Mark 14, was made available on the CMS system. To access it, you use the command GETME NAG NEW. If you are using the Library for the first time, it is advised that you ask for help about how to link it to your FORTRAN programs. To do this, use the HELP NAG command.

Previous versions of the library are now accessible with GETME NAG (Mark 13) and GETME NAG OLD (Mark 11). In all cases, the HELP NAG command will provide you with instructions for linking the corresponding version of the library to a FORTRAN program.

The NAg FORTRAN Library Mark 14 offers a considerably expanded Library. It contains 889 user-accessible routines, including 160 new ones. Two new chapters have been added: "G03 - Multivariate Analysis" and "X05 - Date and Time Utilities". The style of routine documents has also been revised to make them more readable.

Sixty-six of the 160 new routines are in the Statistics chapter. They include the following facilities:

- statistical distribution functions, allowing for non-integer degrees of freedom and non-central distributions;
- linear regression modelling, allowing for weights, rank-deficient models, adding or deleting observations and/or variables; standardized residuals and influence statistics; and model selection routines;
- generalized linear models;
- principal component analysis, canonical correlation analysis, canonical variate analysis;
- nonparametric statistics;

New routines have been introduced for the following problems:

- roots of complex polynomials;
- solution of systems of nonlinear equations by reverse communication;
- inverse Laplace transforms;
- elliptic partial differential equations (P.D.E.s);
- Volterra equations of the second kind;
- bi-cubic spline interpolation and evaluation;
- constrained nonlinear least-squares problems;
- real and complex QR factorization and related operations;
- matrix storage conversion;
- real and complex singular value decomposition (SVD);
- mixed integer linear programming (LP);
- special functions;
- printing matrices;
- date, times, and CPU time;

The F06 chapter now includes the Level 3 Basic Linear Algebra Subroutines (BLAS) and Sparse Level 1 BLAS.

Efficient performance on vector-processing machines has now been extended to additional routines in the following areas:

- linear algebra;
- linear regression;
- nonlinearly constrained optimization;
- random number generators;
- multidimensional quadrature;
- P.D.E.s.

Users interested in more details about the Mark 14 version of the NAg FORTRAN Library are welcome to come and examine the manual. Call Andrzej Pindor at 978-5045 to arrange an appointment.

Facilities Managed by UTCS

Administrative Computing
- administrative IMS, DB2, Batch, and TSO
- 3081K processor, 48 megabytes of memory
- MVS/XA operating system

Computer Disciplines Facility/UNIX
SUN 3/280s, 16 megabytes of memory (zero.cdf)
- Computer Science interactive access
- SUN UNIX 4.0.3

SUN 3/280s, 16 megabytes of memory (one.cdf)
- Computer Science interactive access
- SUN UNIX 4.0.3

Computer Disciplines Facility/PC
- 88 NEC computers connected in a Local Area Network:
  •Robarts Library (Rm. 1061A): 36 NEC PCs
  •St. Michael's College (Rm. 107): 26 NEC PCs
  •Sidney Smith (Rm. 1071): 23 NEC PCs
  •Trinity College (Rm. 024): 3 NEC PCs
- MS-DOS with Turing environment
- introductory computer science

Computers in Quantitative and Empirical Science Teaching (CQUEST)
- 52 DEC VT1000 X Window terminals, 20 DEC 2100 workstations connected in Local Area Network:
  •Ramsay Wright (Rm. 211, 213): 29 DEC VT1000s, 10 DEC 2100s
  •Sidney Smith (Rm. 2105): 20 DEC VT1000s, 10 DEC 2100s
  •Departmental use: 3 DEC VT1000s

Public Sites
- 50 XT100 terminals connected to PACX
  •Robarts Library (Rm. 1061A): 24 terminals
  •Engineering Annex (Rm. 107B): 12 terminals
  •St. Michael's College (Rm. 107): 9 terminals
  •Victoria College (1st floor): 3 terminals
  •Trinity College (Rm. 024): 2 terminals

Erindale College Systems
SUN 3/280, 16 megabytes of memory
- instructional and research access using UNIX

VAX 8200, 8 megabytes of memory
- instructional access using VMS
- research access

Institutional Relations System
VAX-11/750, 8 megabytes of memory
- database services to the owner departments using VMS

EPAS Facility
- 4361-5 processor, 16 megabytes of memory
- general VM/CMS services to the owner departments

Ontario Centre for Large Scale Computation (OCLSC)
- Cray Research Inc. X-MP/28
- 2 processors, 8 megawords main memory
- solid state disk (SSD) with 64 megawords of storage
- UNICOS 5.1.11 operating system
- VAX 8350, MicroVAX-II, VAXstation 3200, and SUN-3/280 provide front-end services

> *The mandate of UTCS is to encourage and support the use of information technologies across campus, and to plan, implement, and operate common-carrier networks and certain appropriate central computer facilities.*

UTCS Centrally Owned and Managed

Systems

IBM VM/CMS
Technical Assistance: 978-6602
- General Purpose Timesharing environment
- Hub of the NetNorth network with access to BITNET, EARN and the Internet
- 4381-R03 processor with 32 megabytes of memory
- CP operating system, VM/SP HPO R5
- CMS timesharing system, VM/SP Release 5
- FTP and TELNET access to the campus ethernet, as well as Internet
- RSCS spooling system, Release 2.3

GP UNIX
Technical Assistance: 978-8853
- General Purpose Timesharing under SUN UNIX 4.1.1
- SUN 4/490, 32 megabytes of memory
- access to Linotronic typesetter
- full access to USENET, an electronic technical information exchange facility
- full access to the Internet, UUCPNET, BITNET, CDNNET

Services

Communications, Networking & Technical Support
Primary Phone: 978-7087
- Communications Group provides communications systems, terminals, modems, data channels: consulting and installation.
- Field Service Group installs and maintains communications and computer systems, particularly IBM PCs and Macintoshes, on a contract basis or on a cost-per-call basis.
- provides consulting on computer systems technology and installs computer systems
- provides access between the IBM systems and machines using UNIX, VMS, and other operating systems. Ethernet, Pronet, and IBM TRN technologies are used over various transmission media including optical fibre. More basic communications techniques are also used for moderate speed links.
- provides consulting on local area networking and installs LANS
- provides access to NetNorth (BITNET), the North American Universities Network; ONET, the Ontario Regional Network; CA*net, the Canadian National Network; and USENET, the UNIX networking fraternity
- provides gateway to the US Internet
- will provide a communications solution to department needs on a contractual basis

Information Centre
Primary Phone: 978-HELP
- Provides assistance in use of electronic messaging, including use of Local Area Networks (LANS); NetNorth/BITNET/EARN, the world Universities network; CDNNET, the Canadian X.400 network; ARPANET; CSNET; USENET; and other international connections.
- provides advising, consulting and, in some cases, documentation on:
  - command languages of CMS and UNIX
  - packages and libraries, including SAS, SPSS, BMDP, IMSL, and NAg
  - editors and formatters, including XEDIT, ed, nroff/troff
- provides general micro support
  - selection consulting for hardware and software
  - Micro Lab for evaluation of hardware and software
  - advice on University discounts
  - media conversion and data transfer
  - CD-ROM access to software and information discs
  - offers PostScript laser printing
  - offers 35mm slide production service using Polaroid Palette
  - administers Local Area Network of PCs for Education Facility
  - administers Macintosh Education Facility
- high-quality typesetting
- provide image and typed text scanning
- installs and maintains application packages
- administers site licenses for various software packages
- provides short courses and seminars on the more popular services and software packages

Telephone Listings

Consulting and Enquiries

Applications Support & Advising Supervisor	Alex Nishri	BC214	978-7109
External Marketing Consultant	Ihor Prociuk	BC217	978-6875
Erindale College	Joe Lim	ER2035	828-5311
Information Office	Evelyn Ward	BC201	978-4990
Account & Access Code Enquiries	Phillip Mun	BC101B	978-7148
IBM & Macintosh Maintenance	Kam Mark	BC103	978-5050
Tape Library (Academic Services)	Susan Kovago	MP368	978-7319
Tape Library (Administrative Services)	Miranda Fong	MP368	978-6693
Communication, Networking & Hardware	Rosi Derka-Tseu	BC105	978-7087
UTCS Noncredit Short Courses	Irene Rosiecki	BC217	978-4565

Consulting & Advising Services:	978-HELP
CMS, and GP UNIX userids:	ADVISOR
CMS Userid for mail problems:	POSTMSTR
Network Operations Centre	978-4621
System Status Enquiries (GP UNIX)	978-4318
System Status Enquiries (IBM)	978-7393
Interactive Services 300 (bps)	978-3959
Interactive Services 1200 (bps)	978-3959
Interactive Services 2400 (bps)	978-7239
Interactive Services 9600 (bps)	978-7220

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Committees on Computing

Supercomputer Users' Group at U of T	Chair	Prof. W.R. Peltier	978-2938
Research Board Standing Committee on Computing	Chair	Prof. C.C. Gotlieb	978-2986

Legend:
BC = Bancroft Building
ER = Erindale
MP = McLennan Physical Labs

* NetNorth/BITNET/EARN

Terminal & Advising Sites

Names and Locations

Central Advising Office (CAO), 978-HELP
Engineering Annex (EA, CDF), 11 King's College Road, Rooms 107, 107B, 201
Erindale College (Erin), 828-5339, 3359 Mississauga Road North, Erindale Campus, Rooms 2037, 2039A-B-C, 2045
Ramsay Wright, 25 Harbord St., Rooms 211, 213
Robarts, Robarts Library, 130 St. George St., Room 1061A
Sidney Smith (Sidney), 100 St. George St., Room 1071, 2105
St.Michael's College, 121 St. Joseph St., Room 107
Trinity College, 6 Hoskin Ave., Room 024
Victoria University, 73 Queen's Park Cres., 1st floor

Access Hours

Sites	Hours of Access				Restrictions*	Advising
	Mon-Thurs	Fri	Sat	Sun		
CAO	10:00-18:00	10:00-18:00	closed	closed	Research	978-HELP
CDF	24 hrs	24 hrs	24 hrs	24 hrs	Undergrads	No
EA	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Erin (2039)∆	9:00-17:00	9:00-17:00	12:00-16:00	12:00-16:00	Research	Rm 2005
(2045-46-47)	24 hrs	24 hrs	24 hrs	24 hrs	Undergrads	Rm 2005
(235)†	8:00-22:00	8:00-17:00	closed	closed	None	Rm 2046
Ramsay Wright	7:00-21:00	7:00-18:00	closed	closed	Undergrads	No
Robarts	8:30-24:00	8:30-24:00	9:00-22:00	13:00-22:00	None	978-HELP for Research
Sidney	7:00-24:00	7:00-24:00	7:00-24:00	7:00-24:00	None	978-HELP for Research
St.Michael's	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Trinity	8:00-23:00	8:00-23:00	closed	closed	None	978-HELP for Research
Victoria	8:30-21:00	8:30-21:00	8:00-13:00	8:00-13:00	None	978-HELP for Research

Sites	Advising Hours
CAO	Monday through Friday, 10:00 - 18:00
Erin	Monday through Friday, 09:00 - 22:00

Legend

* Research includes graduates, faculty, staff.
∆ Key access available.
† Access restricted to building hours.

Computer and Printer Access

Sites	PACX	CDF/PC	CQUEST	Printers
CDF				Y
EA	Y			Y*
Erin	Y			Y*
Ramsay Wright			Y	Y**
Robarts	Y	Y		Y*
Sidney		Y	Y	Y**
St.Michael's	Y	Y		Y*
Trinity	Y	Y		
Victoria	Y			

(Y=yes, N=no)
* Public Printers **Site Only

UTCS Site Licenses

UTCS administers a number of software site licenses available to the University of Toronto community. (Usually, this means faculty, staff, and graduate students, though some licenses apply to undergraduate students also. See "Restrictions" in the table below.) The licenses provide a variety of software at much-reduced cost. The majority of the licenses must be renewed each year. Most are terminated when you leave U of T.

Each license has a contract that you must complete. It outlines your responsibilities and any limitations in the use of the software. Except for ProComm, the contracts and software are available from the UTCS Information Office, 4 Bancroft Avenue, Room 201. ProComm is available from the UTCS Advising Office, 978-HELP. To qualify as a member of the U of T community, you must provide a valid Employee number or Student number.

The table below describes the available site licenses. The Restrictions column specifies who may purchase the license. If the restriction is Research, the payment must come from research money. The Diskettes column describes how you actually receive the software. Large packages, like SAS and SPSS, require that you borrow the diskettes, install the software, and return the diskettes. Smaller packages, consisting of up to five diskettes, either require you to bring your own diskettes or include the cost of the UTCS-supplied diskettes in the license fee.

For more detailed information about these site licenses, telephone the UTCS Information Office at 978-4990.

Site Licenses at UTCS

Product Name	***Chaos in the Classroom I: Maps and Bifurcations***	***ProComm***	***QuickMail***
System	PC;	PC; Communications	Mac; Electronic mail
Restrictions	Faculty, Staff, Graduate Students	Faculty, Staff, Graduate Students, Undergraduate	Faculty, Staff
Cost	$12	Free	$35 per user Upgrades: $17
License Period	One-time fee	N/A	One-time fee
Diskettes	One 5.25" or one 3.5"; bring own	Two 5.25"; bring own	One 3.5"; bring own
Documentation Available at UTCS	Yes	On disk; part of package	No

Product Name	***SAS/PC***	***SAS/PC network***	***SAS/UNIX (SUN 3)***
System	PC; Statistical analysis	PC; Statistical analysis	UNIX; Statistical analysis
Restrictions	Faculty, Staff, Graduate Students, Undergraduate	Faculty, Staff, Graduate Students	Faculty, Staff, Graduate Students
Cost	BASE/STAT/GRAPH/FSP: $35; IML module: $22; ETS module: $35.	$17 per station	$198 BASE/STAT/GRAPH; $70 ea. FSP, IML modules
License Period	July 1-June 30	July 1-June 30	July 1-June 30
Diskettes	Deposit per binder Maximum $350	Deposit per binder Maximum $350	Tape cartridge
Documentation Available at UTCS	Yes	Yes	Yes

Site Licenses at UTCS *cont.*

Product Name	*SAS/UNIX (SUN 4 and HP 8)*	*SPSS/PC*	*SYSTAT*
System	UNIX; Statistical analysis	PC; Statistical analysis	Mac; Statistical analysis
Restrictions	Faculty, Staff, Graduate Students	Research	Faculty, Staff, Graduate Students
Cost	$264 BASE/STAT/GRAPH; $92 ea. FSP, IML modules	$100	$58
License Period	July 1-June 30	Nov 1-Oct 31	July 1-June 30
Diskettes	Tape cartridge	Deposit $25 per box; 2-3 boxes	Five 800KB 3.5" diskettes; bring own
Documentation Available at UTCS	Yes	No	Yes

Product Name	*WATFOR-77*	*WordPerfect*
System	PC; FORTRAN compiler	PC; Word Processing
Restrictions	Research	Faculty, Staff
Cost	$35 [$35 WATFOR-87 (math co-processor)]; Add $5 GKS (Graphics Kernal System)	New: $42 Upgrade: $15
License Period	July 1-June 30	One time fee
Diskettes	Two-three 5.25" diskettes; bring own	Deposit $25 per box; 1 box
Documentation Available at UTCS	Yes	Yes

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